US007421935B2

(12) **United States Patent**
Ho et al.

(10) **Patent No.: US 7,421,935 B2**
(45) **Date of Patent: Sep. 9, 2008**

(54) **BARREL LOCKING APPARATUS FOR A PAINTBALL GUN**

(75) Inventors: **Stephen Ho**, Sugarland, TX (US); **Kheng Phang**, Sugarland, TX (US)

(73) Assignee: **Avalon Advanced Products, Inc**, Sugarland, TX (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 4 days.

(21) Appl. No.: **11/672,496**

(22) Filed: **Feb. 7, 2007**

(65) **Prior Publication Data**

US 2007/0193569 A1 Aug. 23, 2007

Related U.S. Application Data

(63) Continuation-in-part of application No. 11/483,257, filed on Jul. 7, 2006, which is a continuation-in-part of application No. 11/402,211, filed on Apr. 11, 2006, which is a continuation-in-part of application No. 11/157,131, filed on Jun. 20, 2005, which is a continuation-in-part of application No. 11/069,768, filed on Mar. 1, 2005, now Pat. No. 7,210,389, which is a continuation-in-part of application No. 10/862,005, filed on Jun. 4, 2004, now Pat. No. 7,021,303.

(51) **Int. Cl.**
F41A 21/00 (2006.01)

(52) **U.S. Cl.** **89/30**; 124/80; 42/70.01

(58) **Field of Classification Search** 89/30, 89/31; 124/80, 83; 42/96, 70.01, 70.11; 222/563; 220/326, 315
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

184,335	A *	11/1876	Calmus	138/96 R
1,223,156	A *	4/1917	Du Bois	220/315
3,354,569	A *	11/1967	Kassabian	42/96
3,437,231	A *	4/1969	Carpenter, Jr.	220/601
3,506,157	A *	4/1970	Dukess	222/94
4,534,088	A *	8/1985	Ricke	24/295
4,660,804	A *	4/1987	Liu	251/149.6
4,912,869	A *	4/1990	Govett	42/105
5,381,919	A *	1/1995	Griffin et al.	220/326
6,176,032	B1 *	1/2001	Cohen et al.	42/96
6,289,623	B1 *	9/2001	Cohen et al.	42/96
6,708,950	B2 *	3/2004	Christensen et al.	251/342
6,733,047	B1 *	5/2004	Stieler	285/319
6,786,516	B2 *	9/2004	Cronley	285/322
6,935,537	B2 *	8/2005	Tellez	222/168
6,973,863	B1 *	12/2005	Jones	89/14.2
7,044,505	B2 *	5/2006	Takayanagi	285/93
7,044,506	B2 *	5/2006	Dong	285/319
2004/0200840	A1 *	10/2004	Oser et al.	220/315
2006/0101697	A1 *	5/2006	Bushnell	42/76.01
2006/0185658	A1 *	8/2006	Stevens	124/80
2006/0277812	A1 *	12/2006	Cole	42/96
2007/0181114	A1 *	8/2007	Tippmann et al.	124/71
2007/0234624	A1 *	10/2007	Brunn	42/105

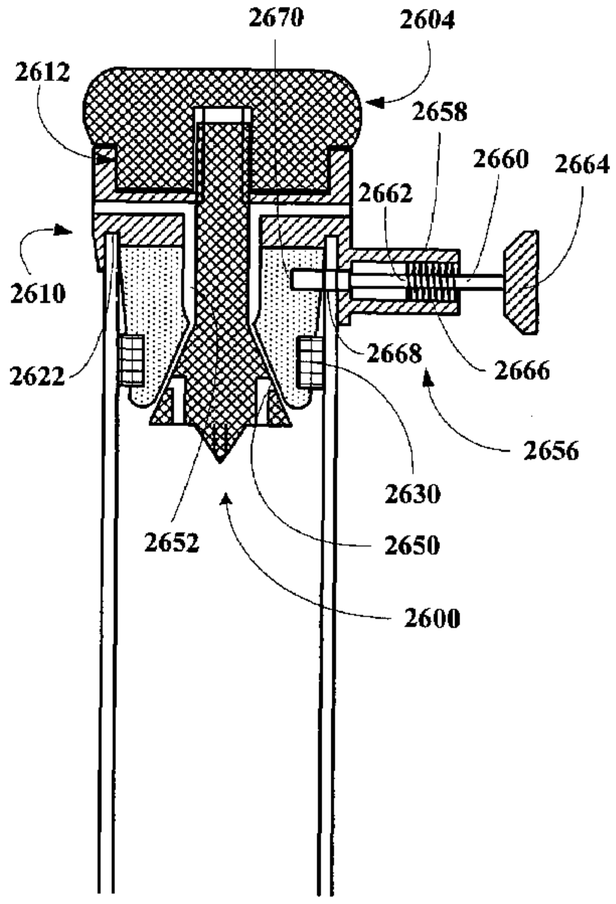
* cited by examiner

Primary Examiner—Michael J. Carone
Assistant Examiner—Stewart T Knox
(74) *Attorney, Agent, or Firm*—Robert W. Strozier

(57) **ABSTRACT**

Paintball or non-lethal gun or marker apparatuses are disclosed to prevent projectiles from being inadvertently discharged from a paintball or other non-lethal gun or markers.

5 Claims, 36 Drawing Sheets



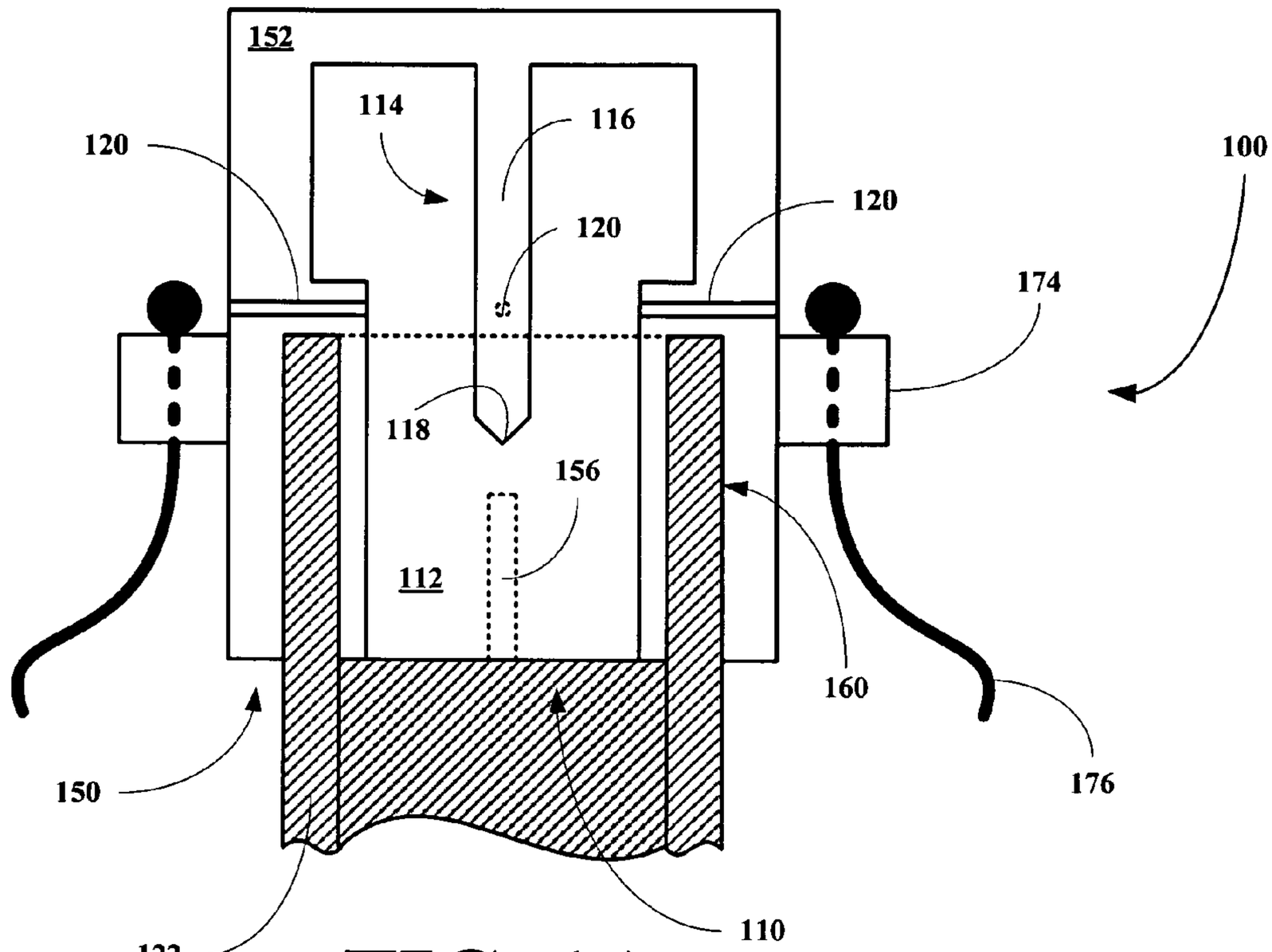

152
114
116
120
120
120
100
174
118
156
112
160
150
176
122
110

FIG. 1A

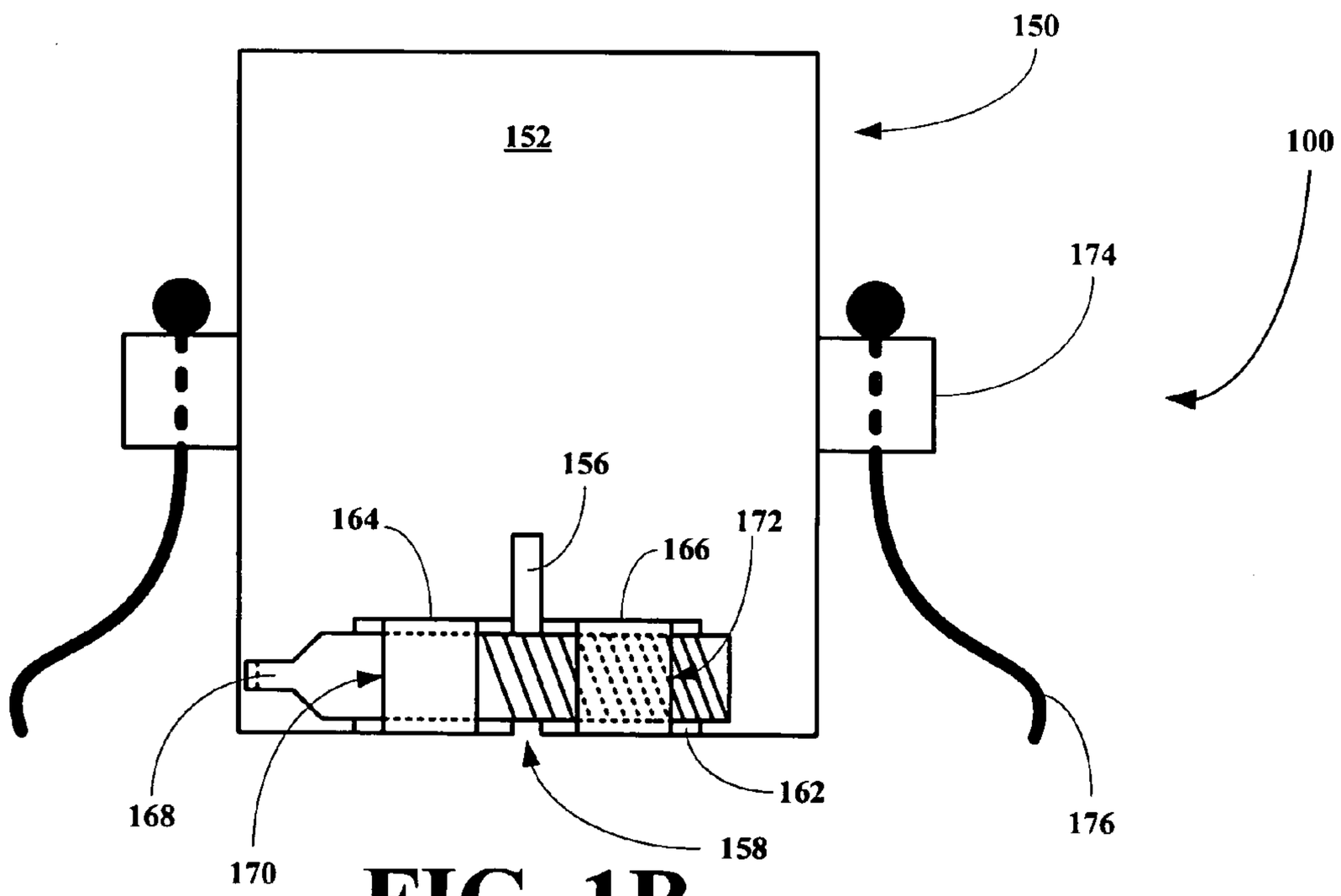

150
152
100
174
156
164
166
172
168
170
162
158
176

FIG. 1B

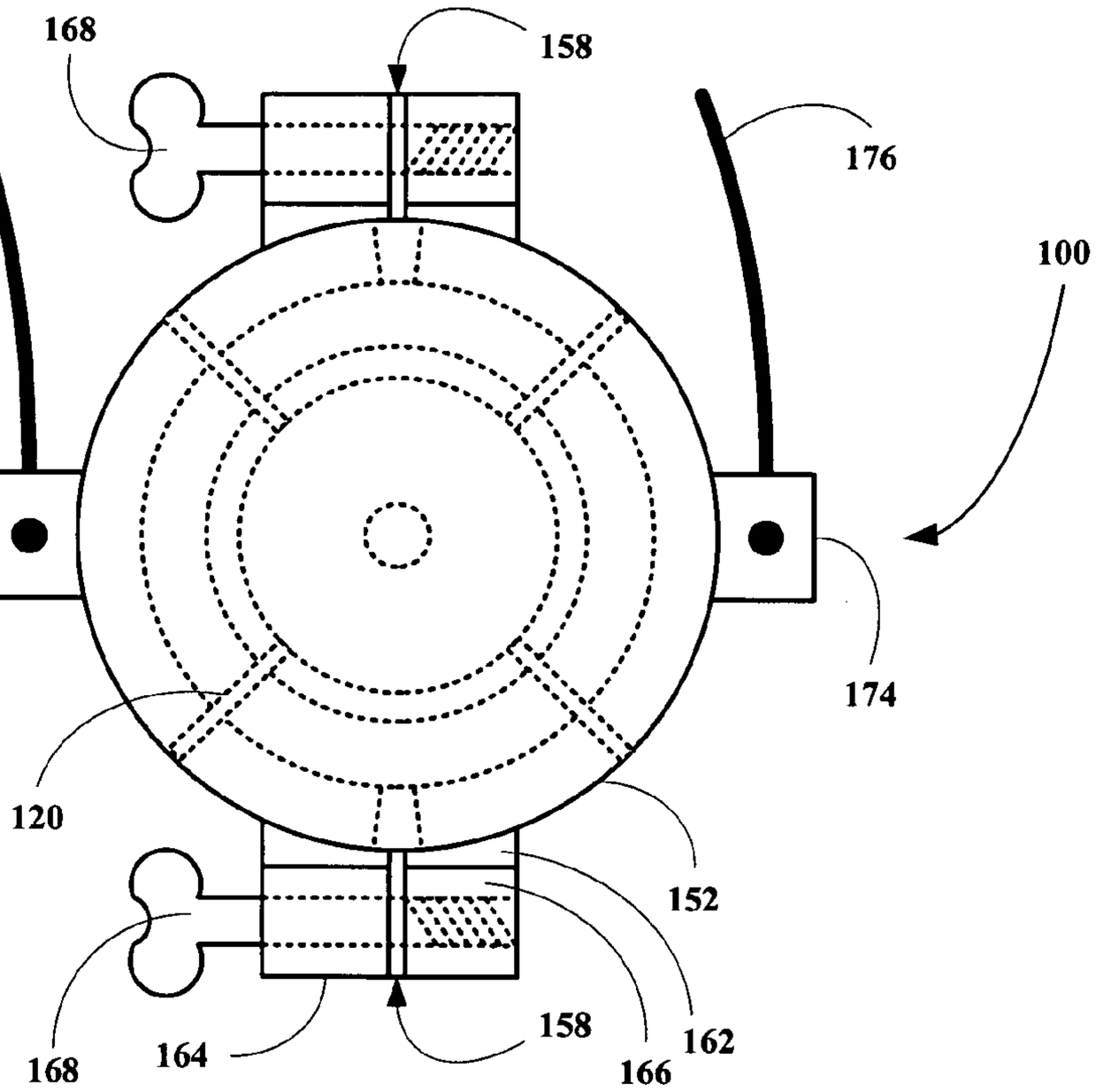

168
158
176
100
174
120
152
168
164
158
166
162

FIG. 1C

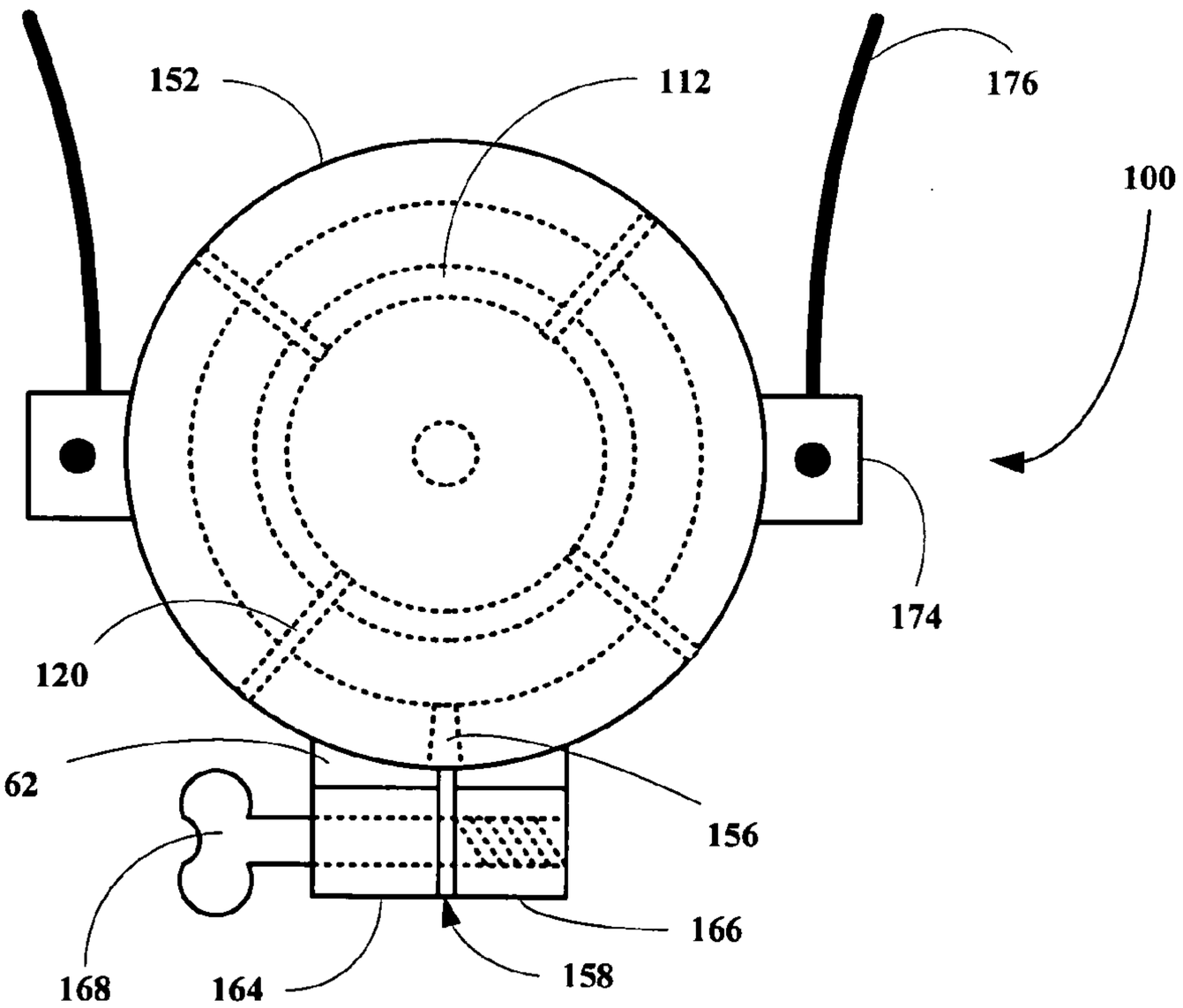

152
112
176
100
174
120
162
156
166
168
164
158

FIG. 1D

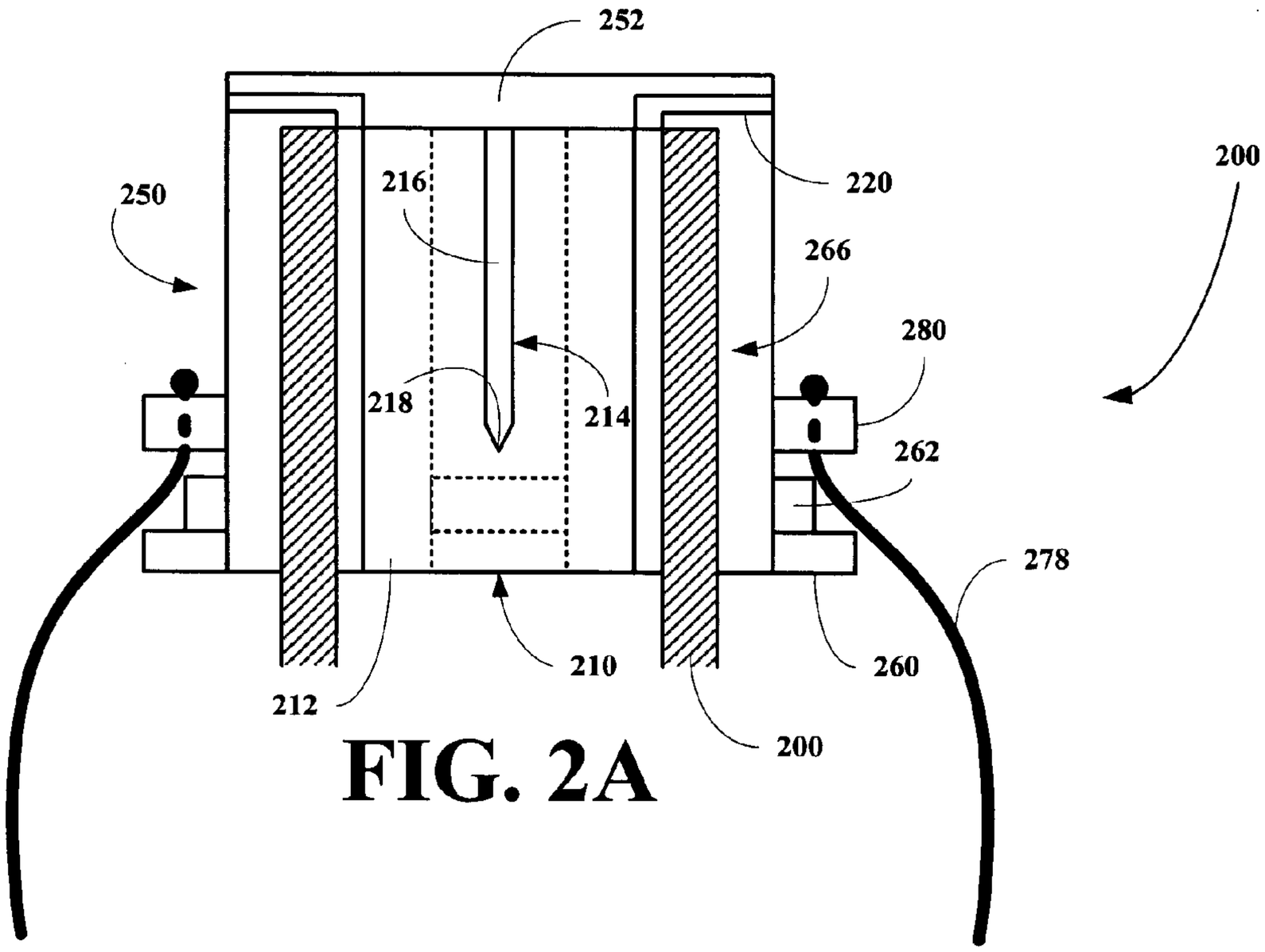

252
250
216
220
200
266
280
218
214
262
278
210
212
260
200

FIG. 2A

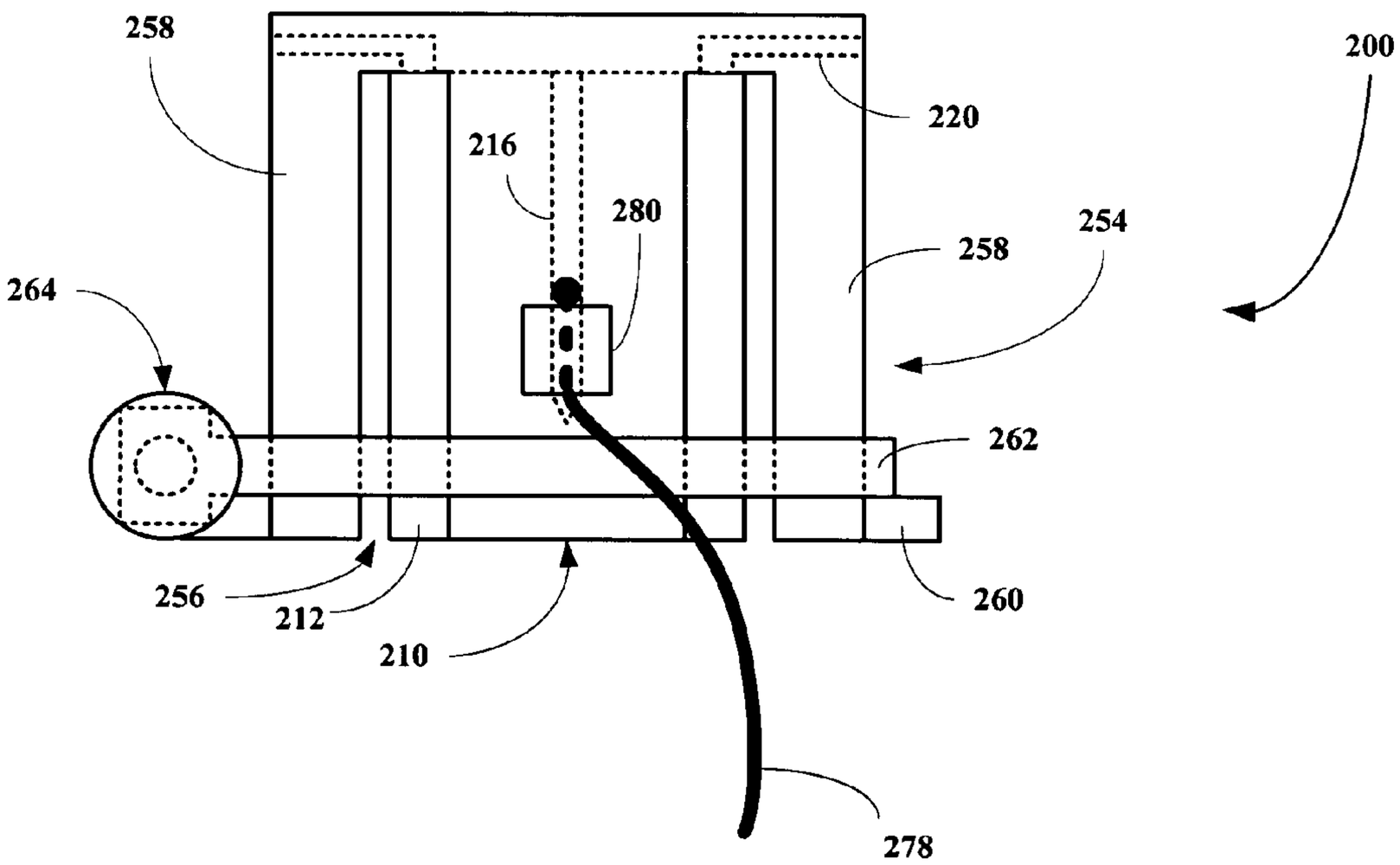

258
220
200
216
280
254
258
264
262
256
212
210
260
278

FIG. 2B

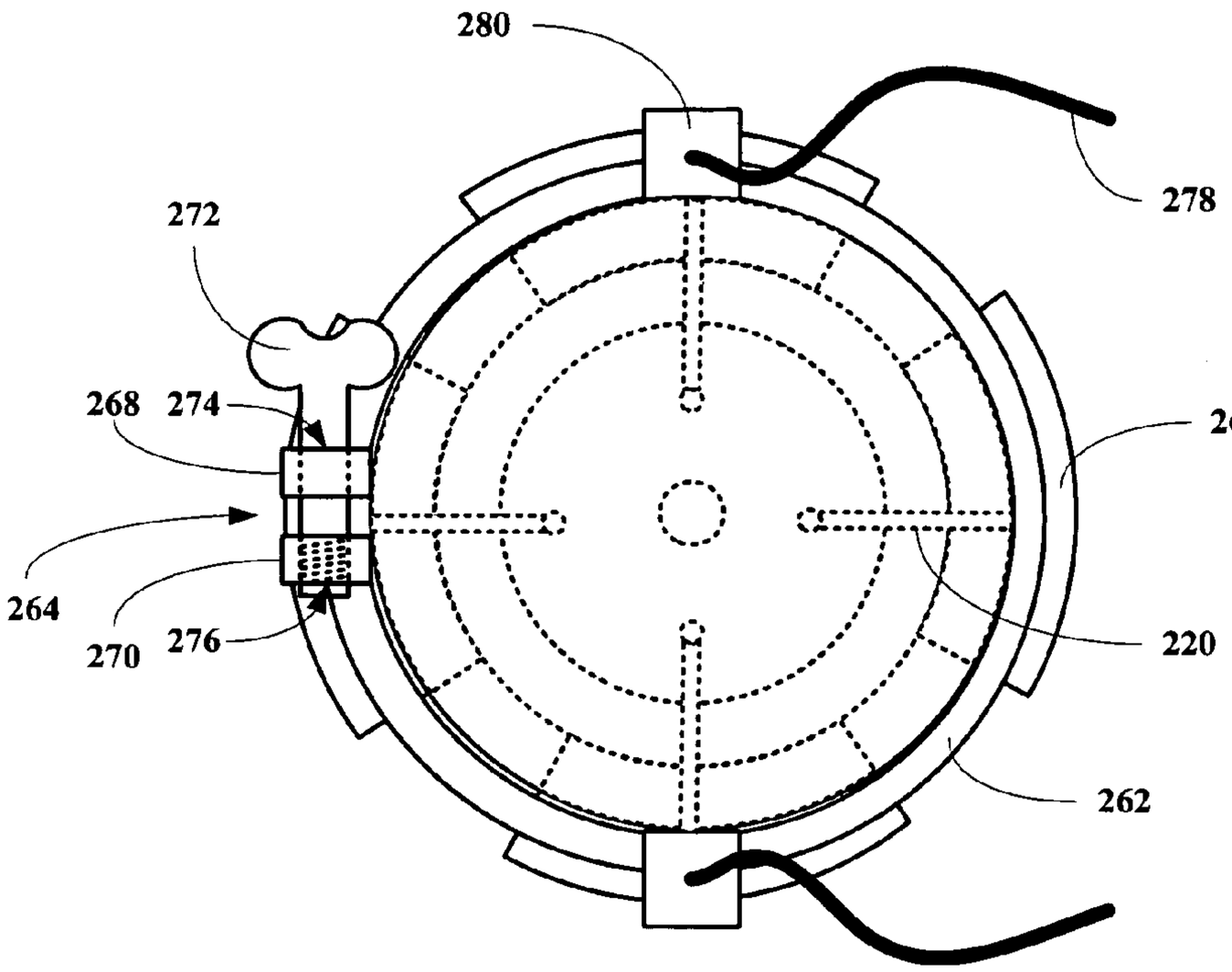


FIG. 2C

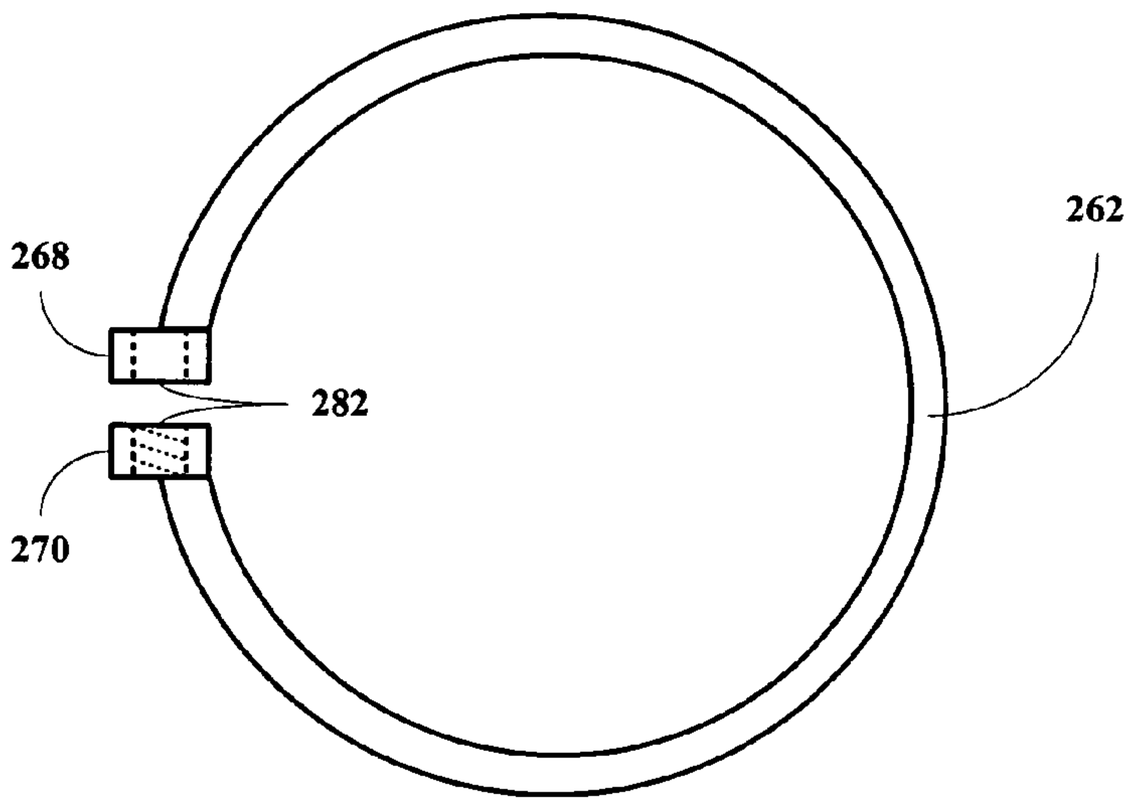


FIG. 2D

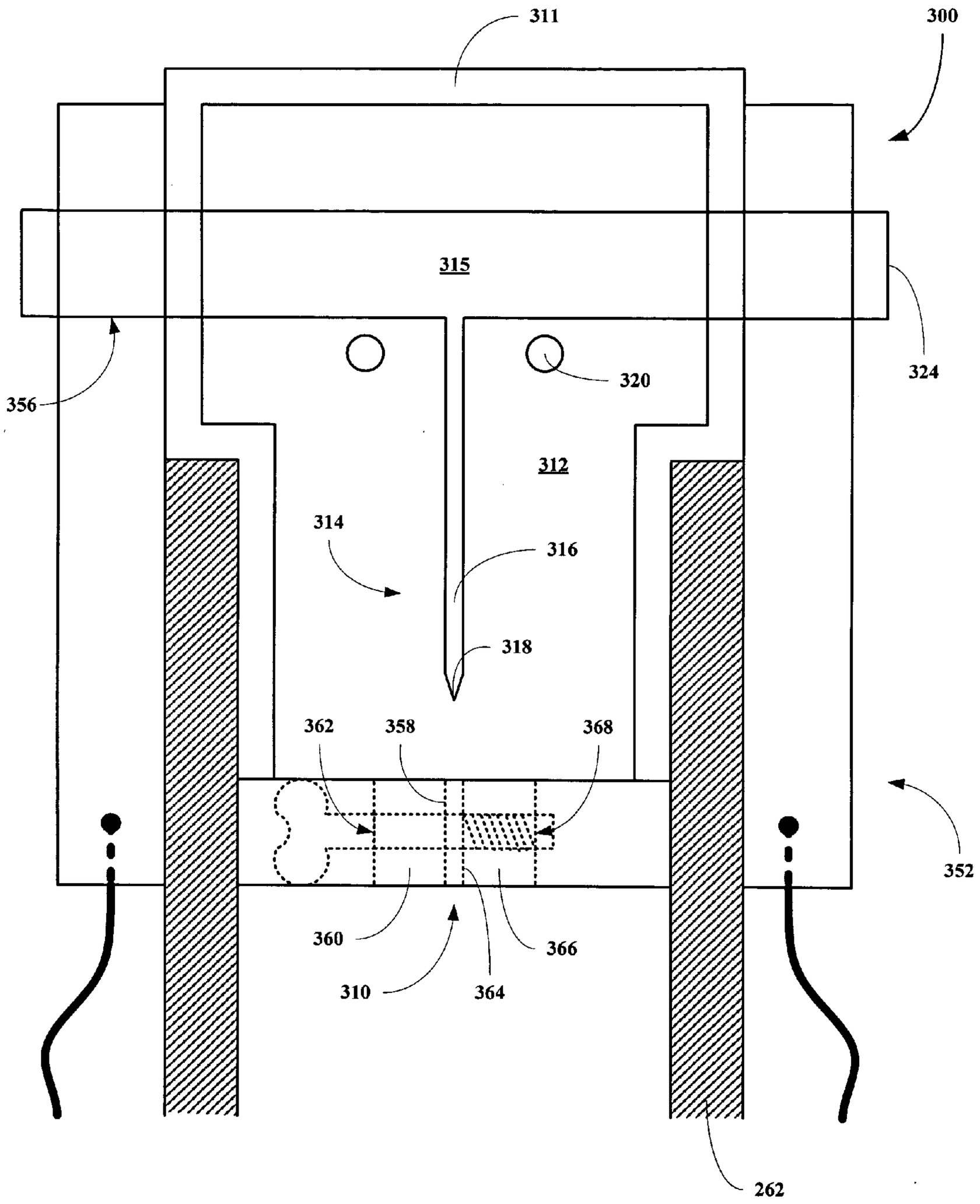

311
300
315
324
320
356
312
314
316
318
362
358
368
352
360
366
310
364
262

FIG. 3A

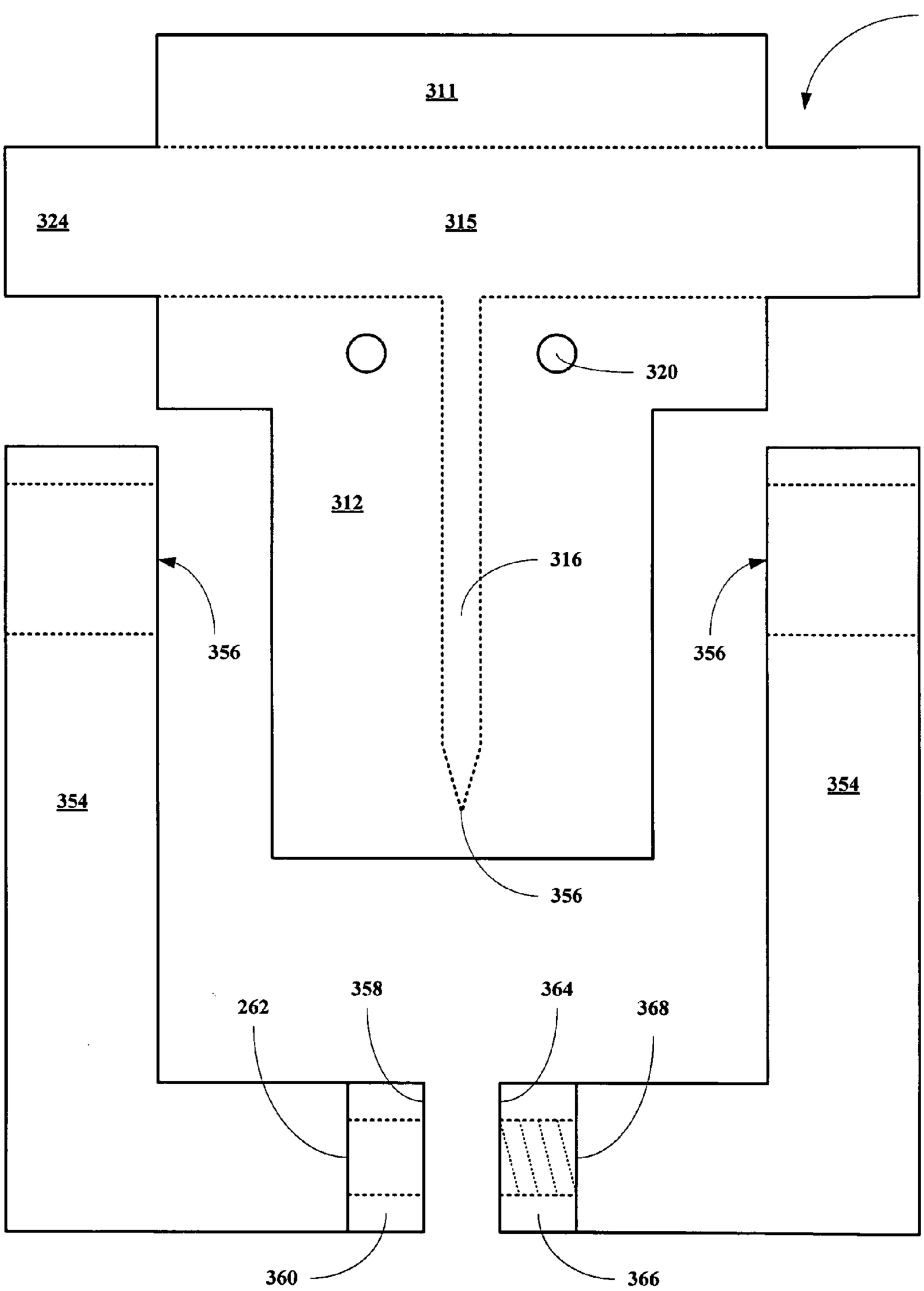

310
311
324
315
320
312
316
356
356
354
354
356
262
358
364
368
360
366

FIG. 3B

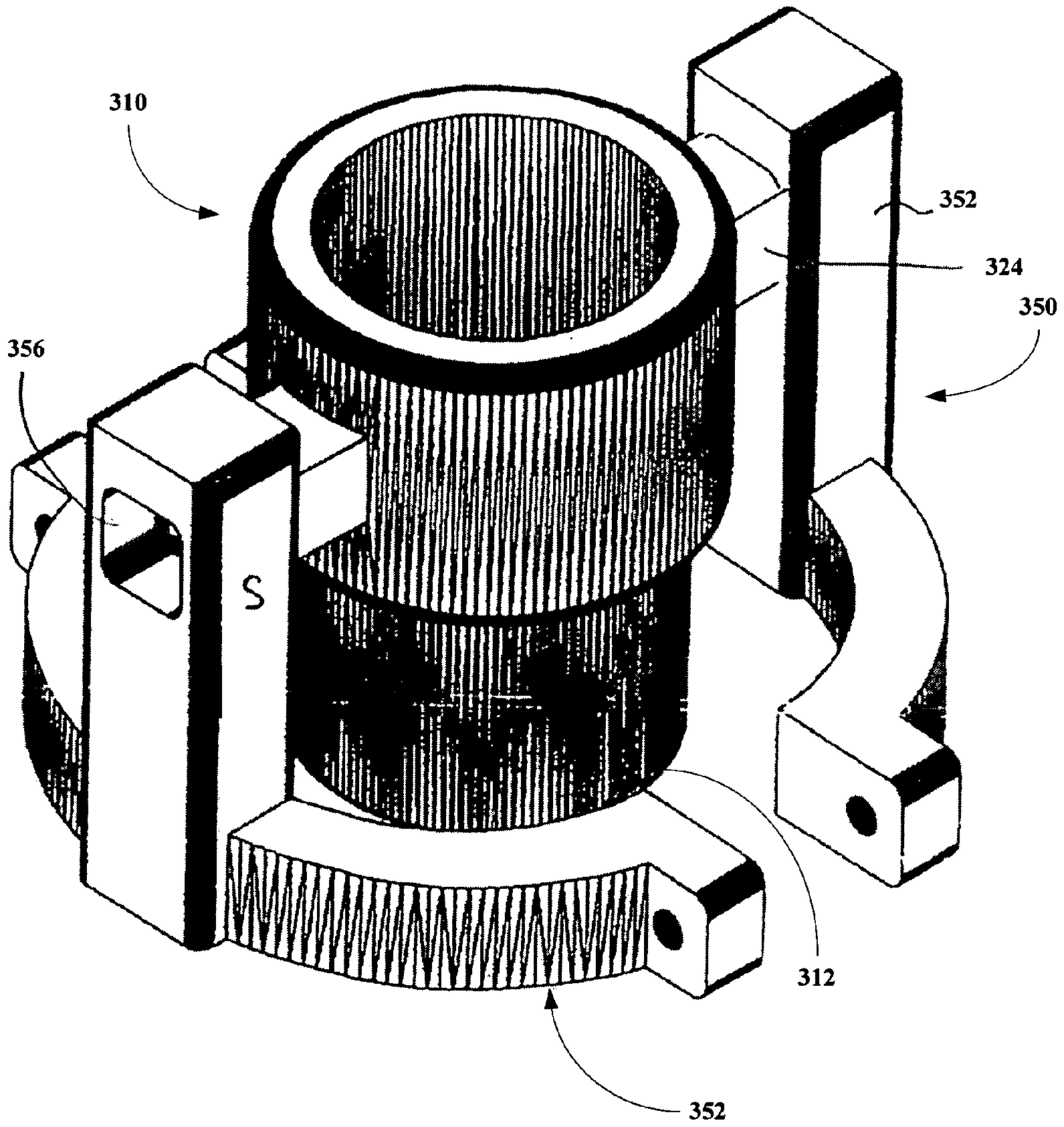


FIG. 3C

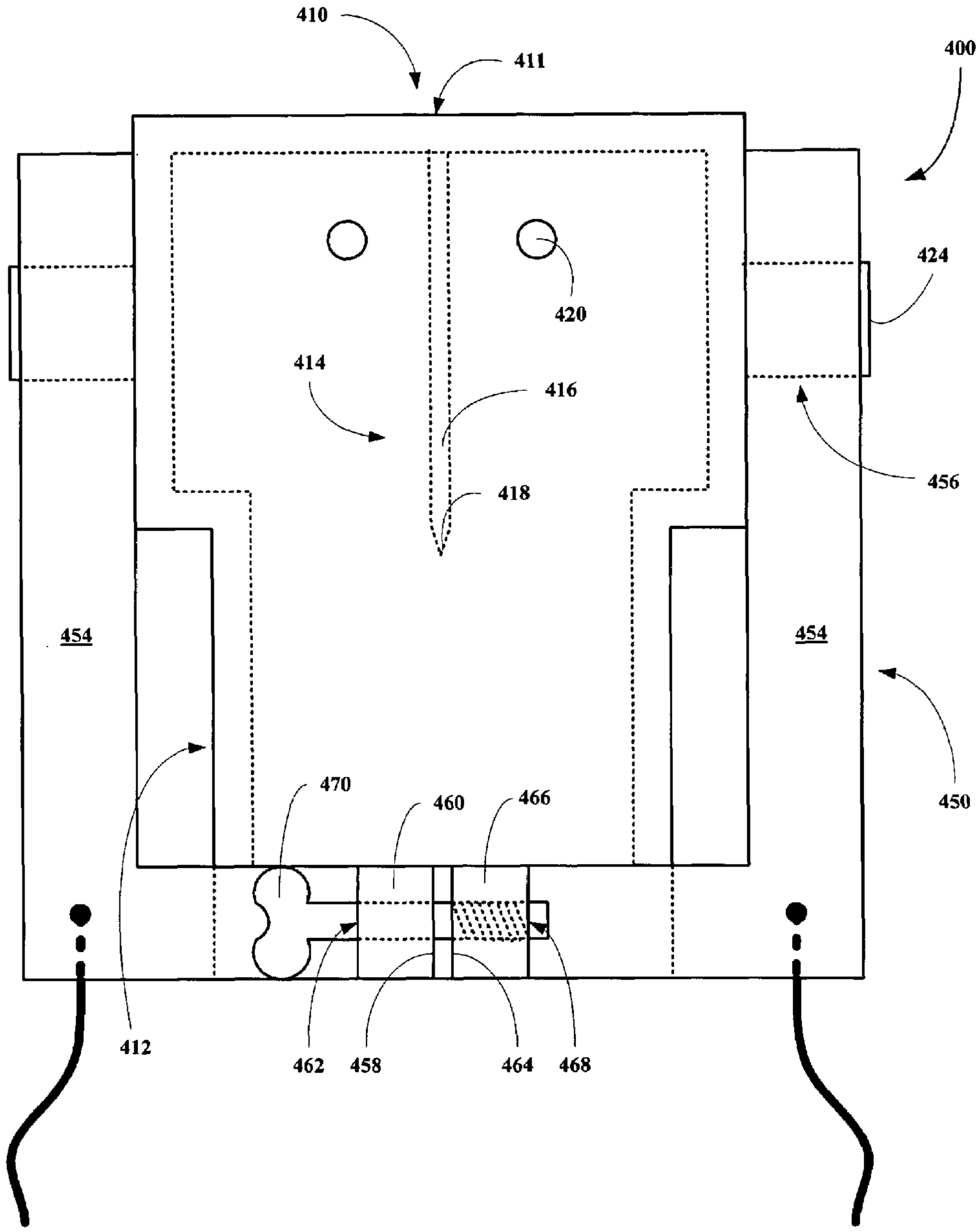

410
411
400
420
424
414
416
456
418
454
454
450
470
460
466
412
462
458
464
468

FIG. 4

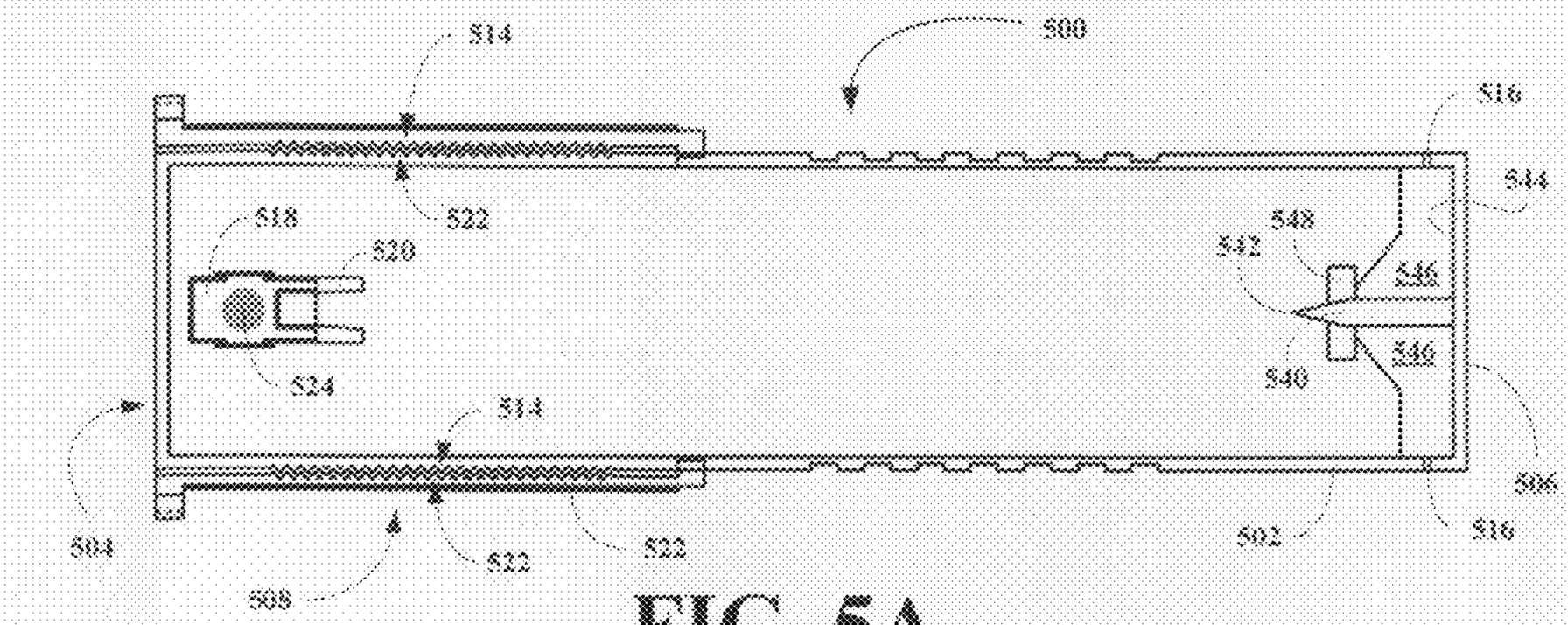


FIG. 5A

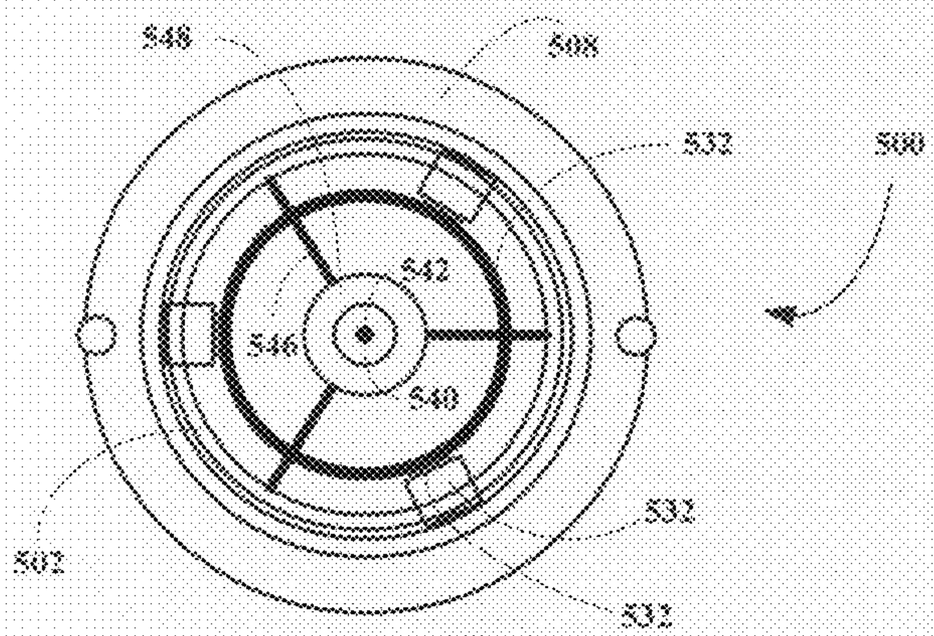


FIG. 5B

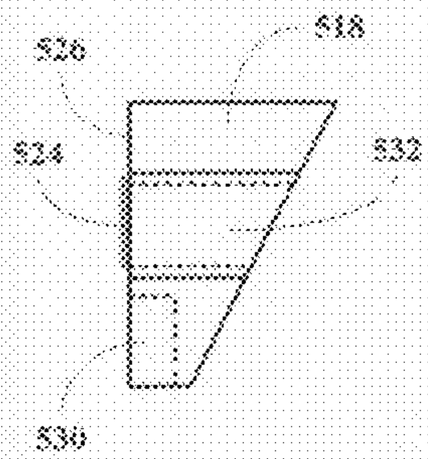


FIG. 5C

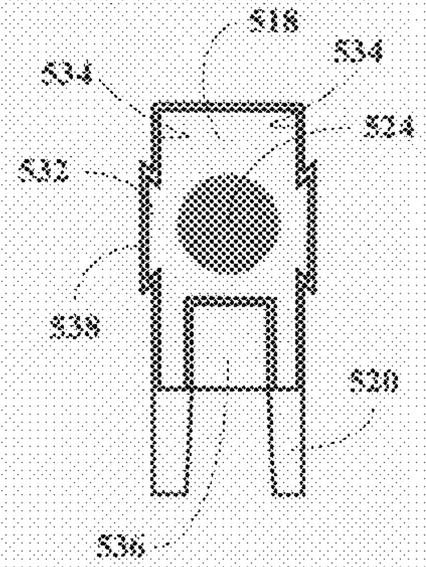


FIG. 5D

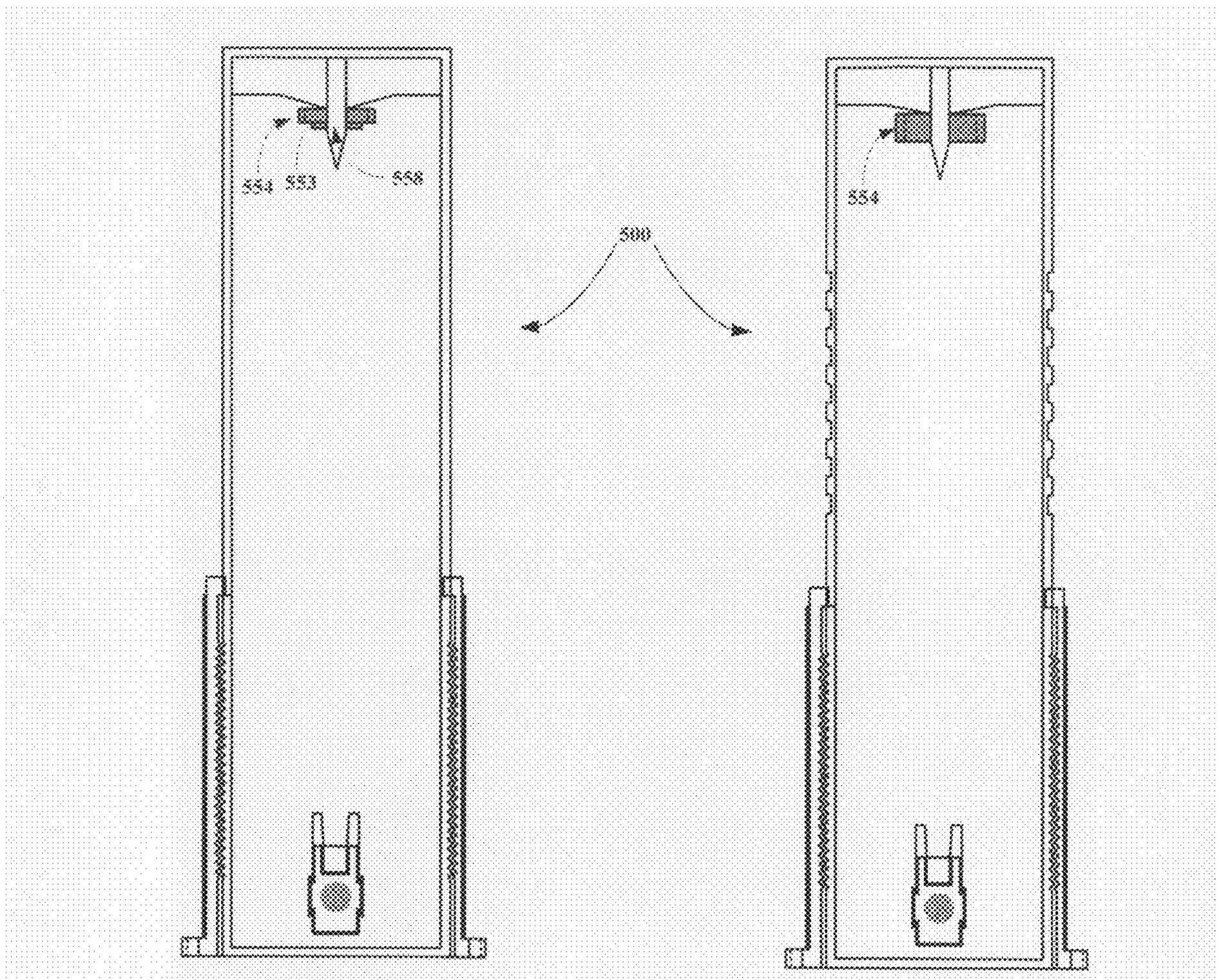


FIG. 5E

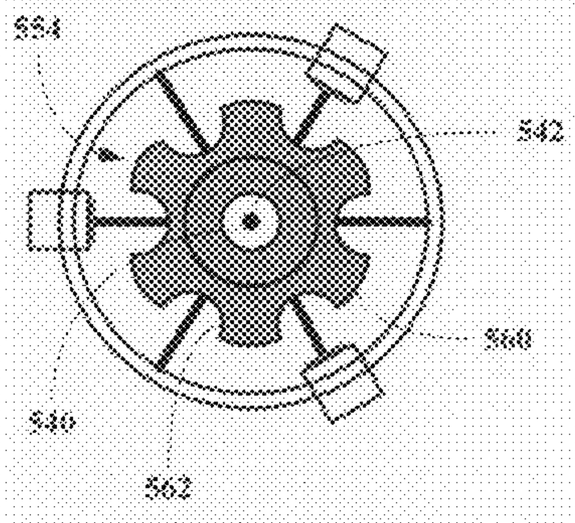


FIG. 5F

FIG. 5G

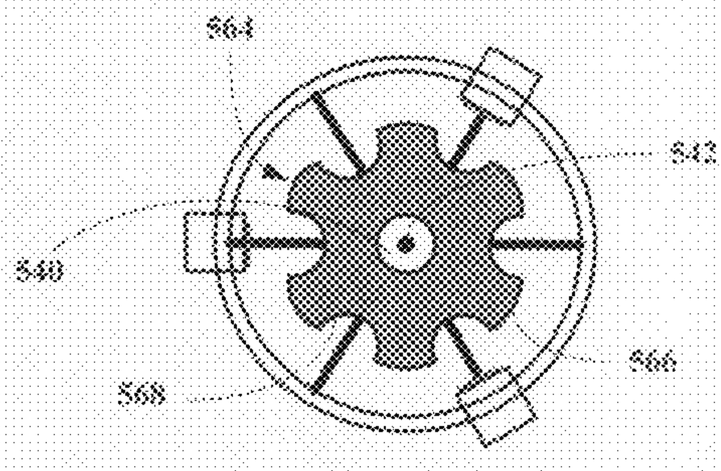


FIG. 5H

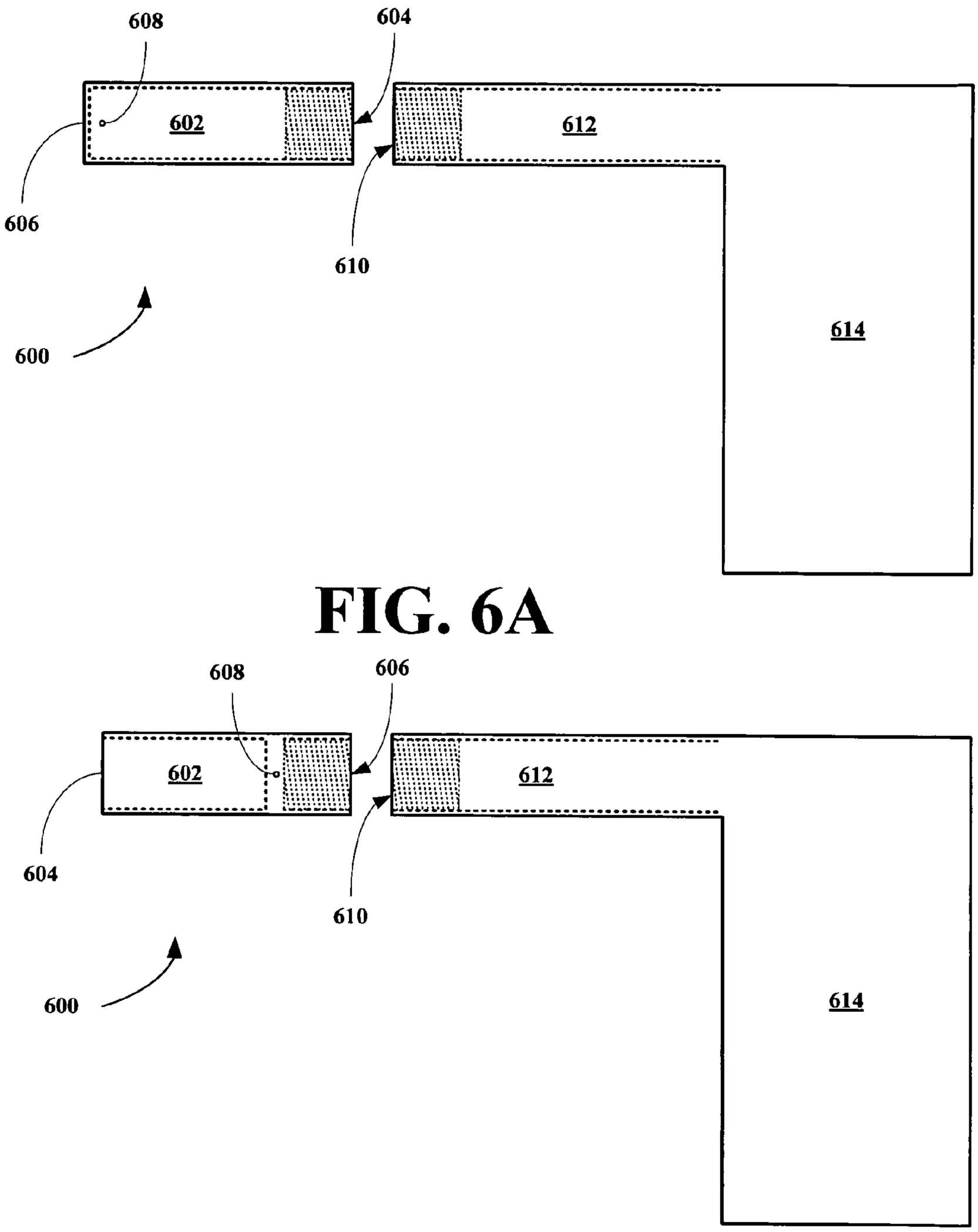


FIG. 6A

FIG. 6B

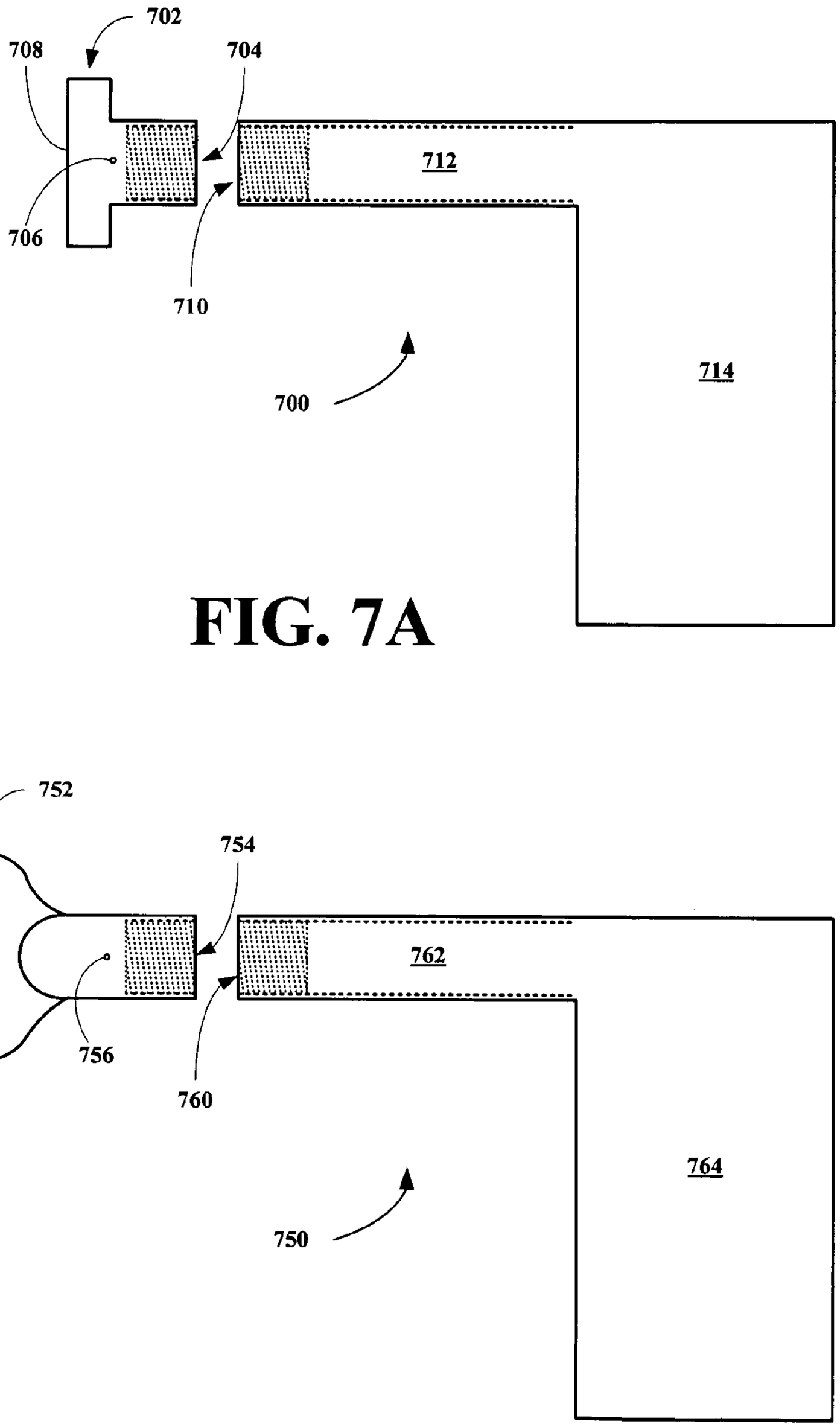


FIG. 7A

FIG. 7B

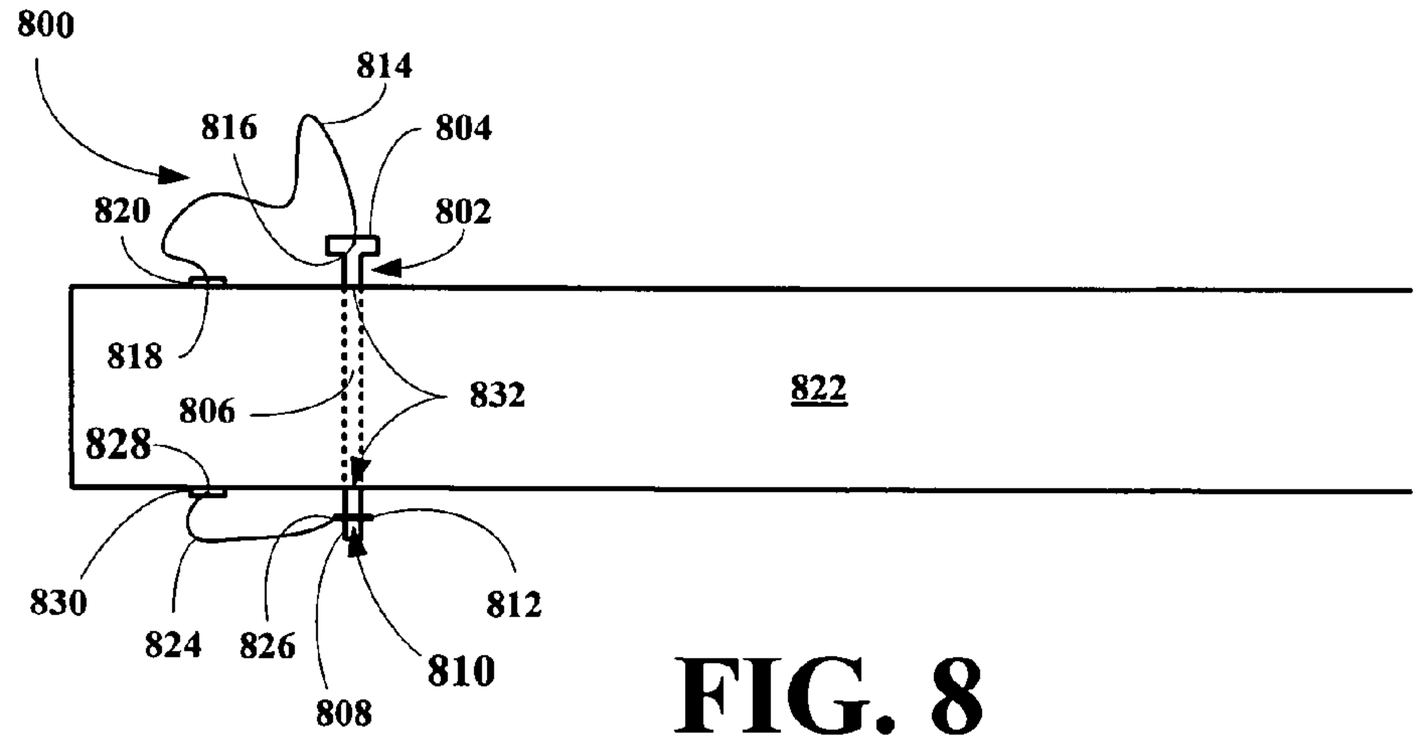


FIG. 8

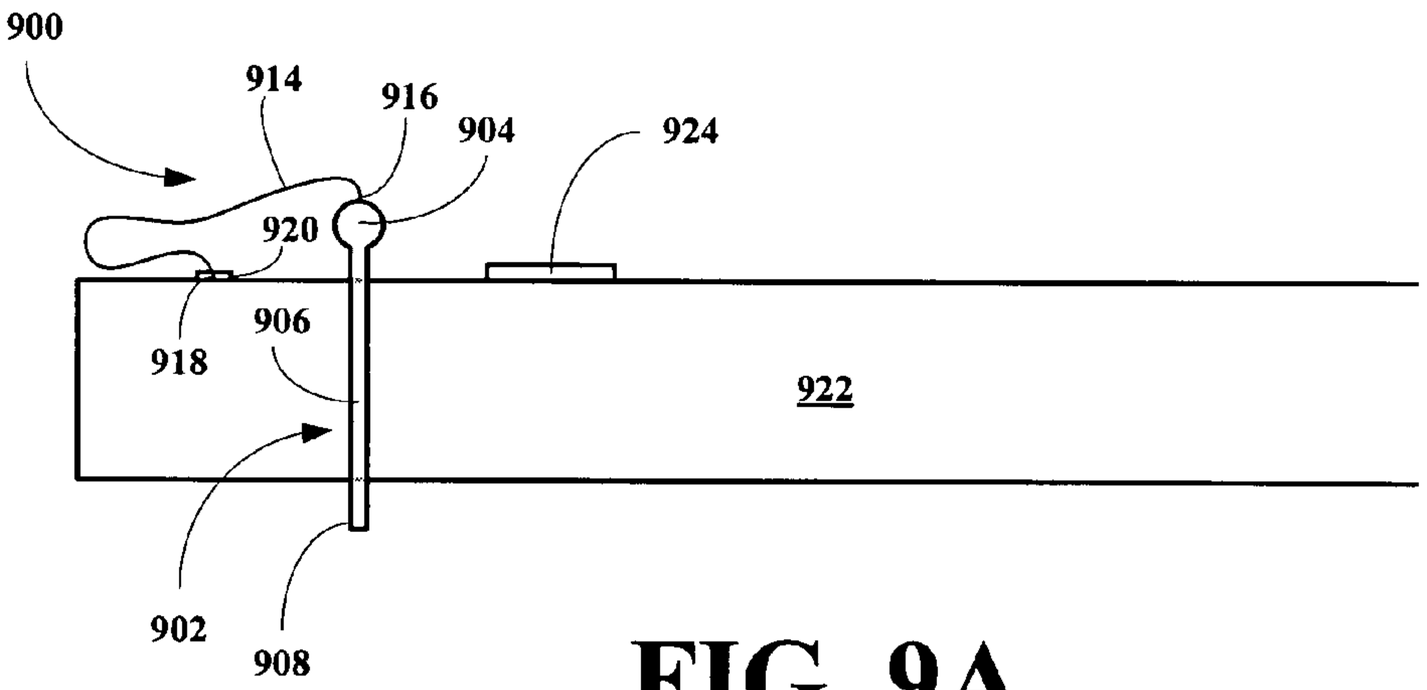


FIG. 9A

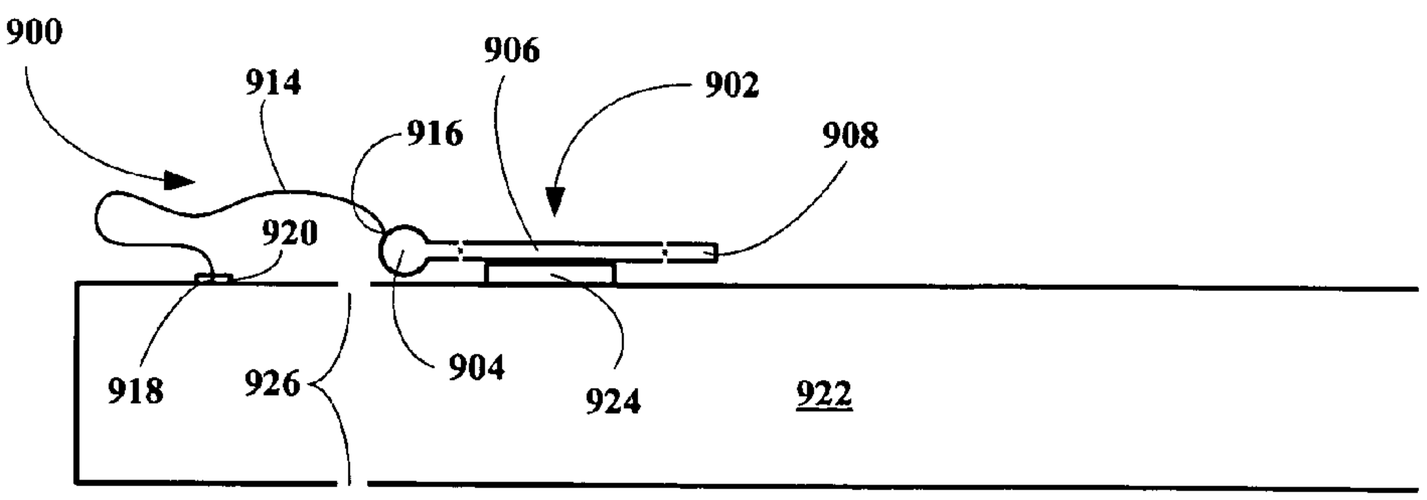


FIG. 9B

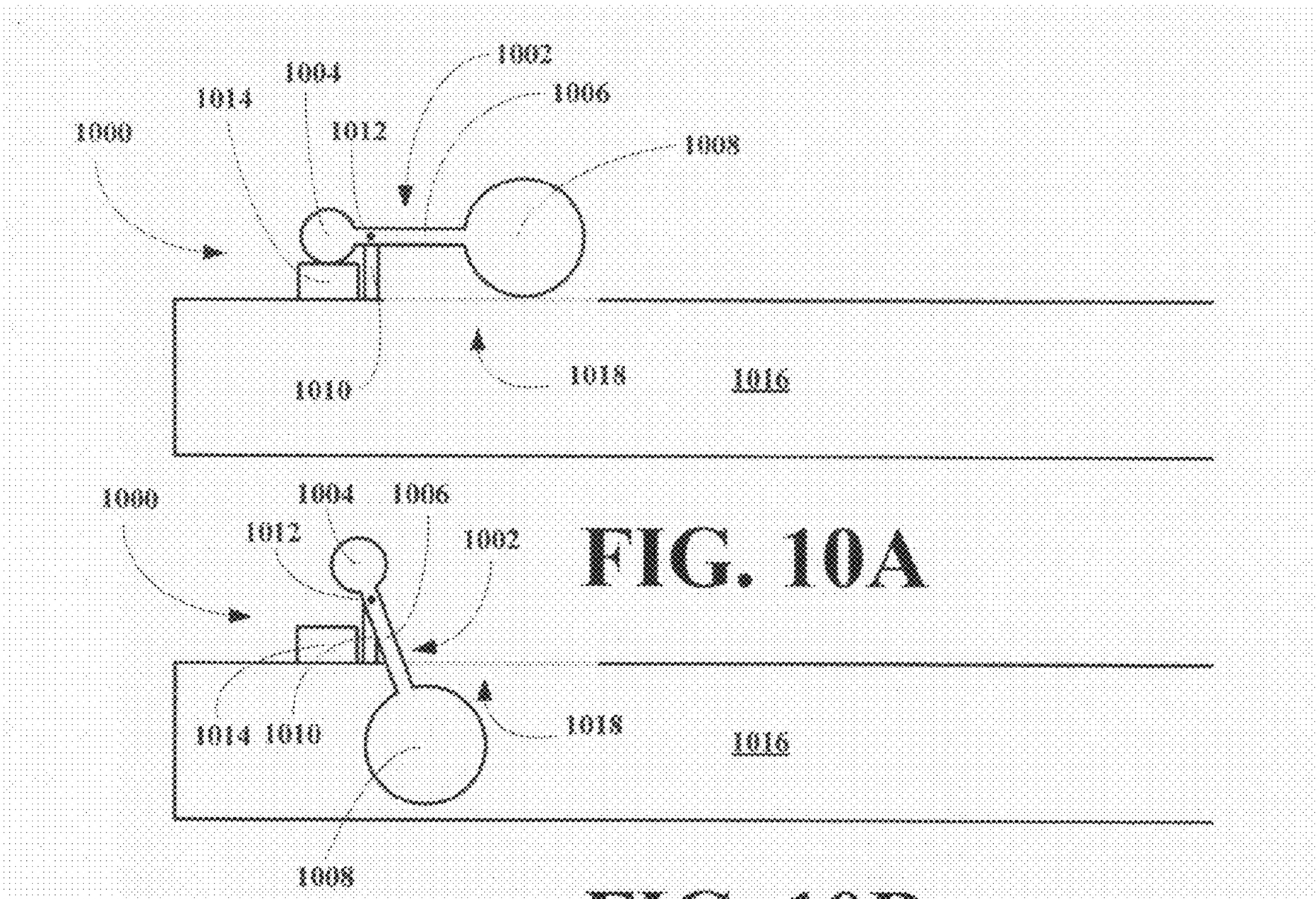


FIG. 10A

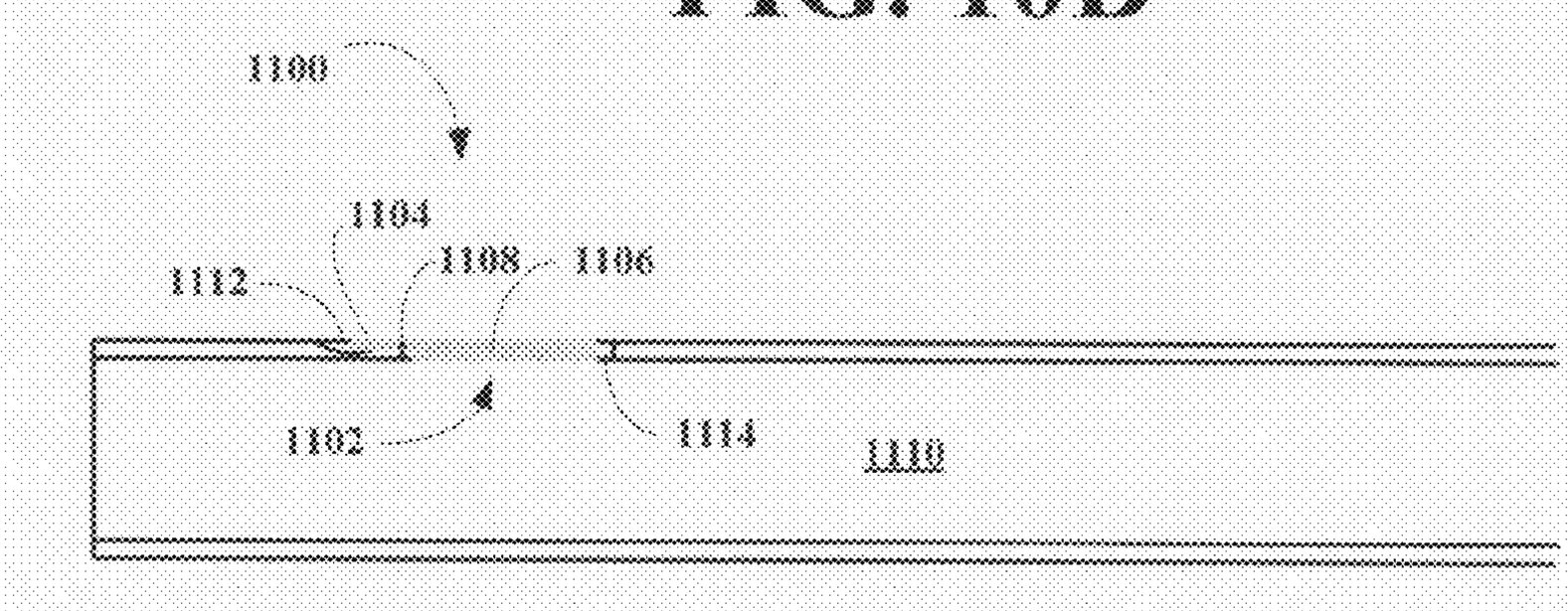


FIG. 10B

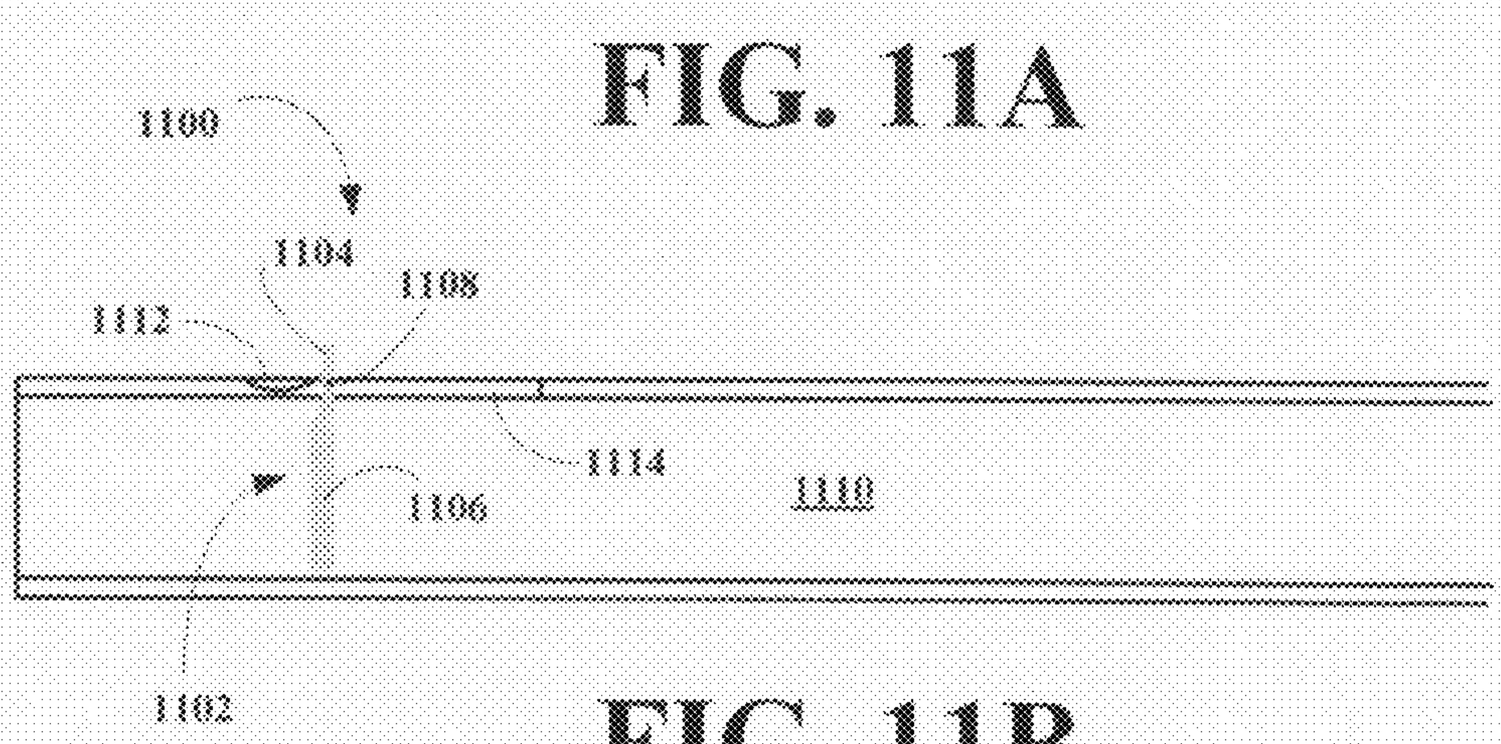


FIG. 11A

FIG. 11B

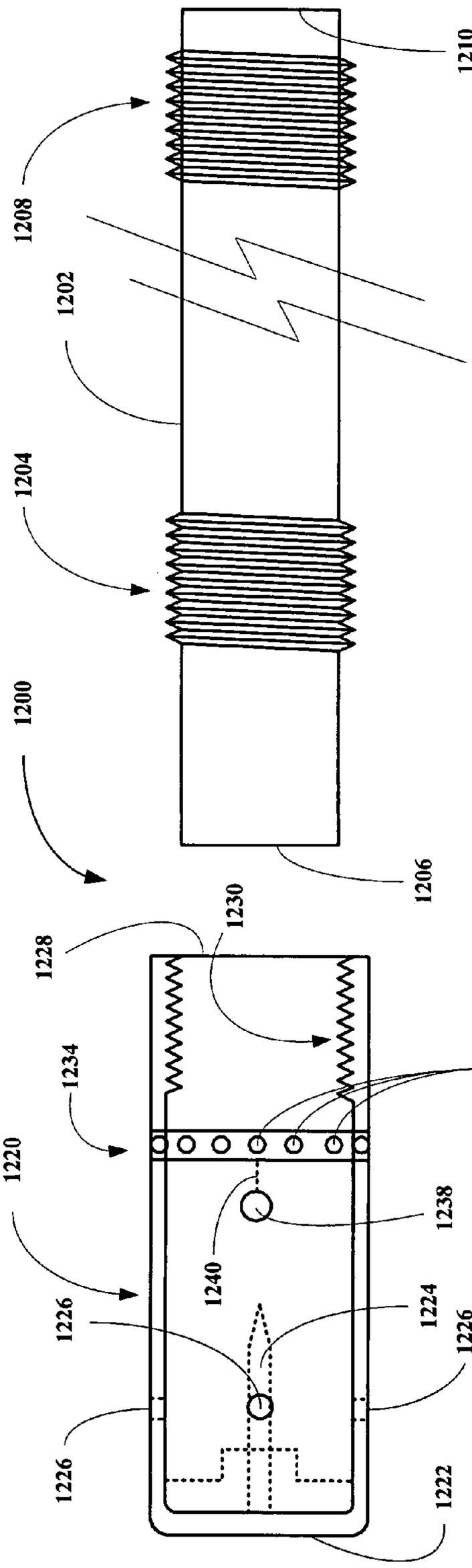


FIG. 12A

FIG. 12B

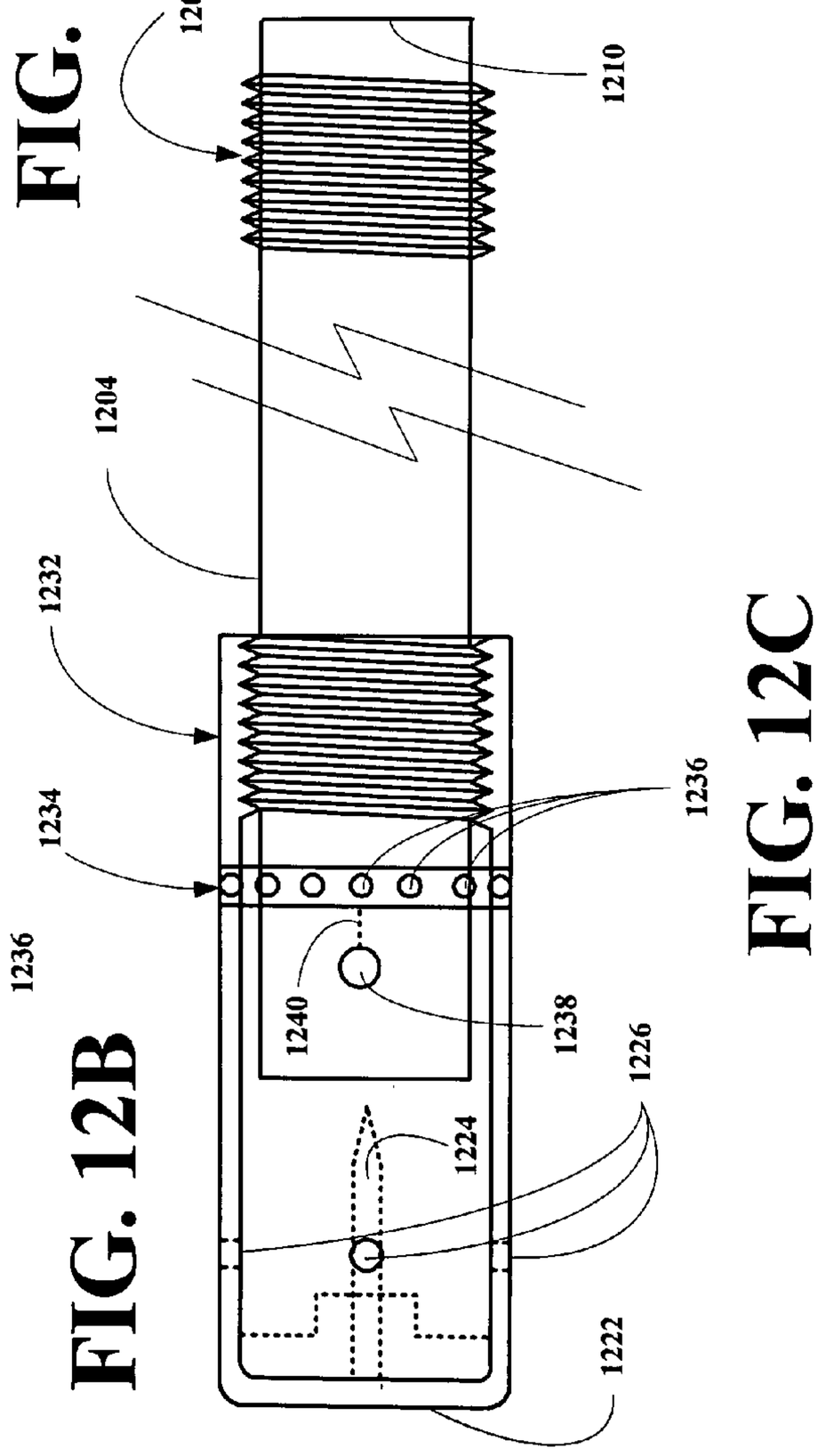


FIG. 12C

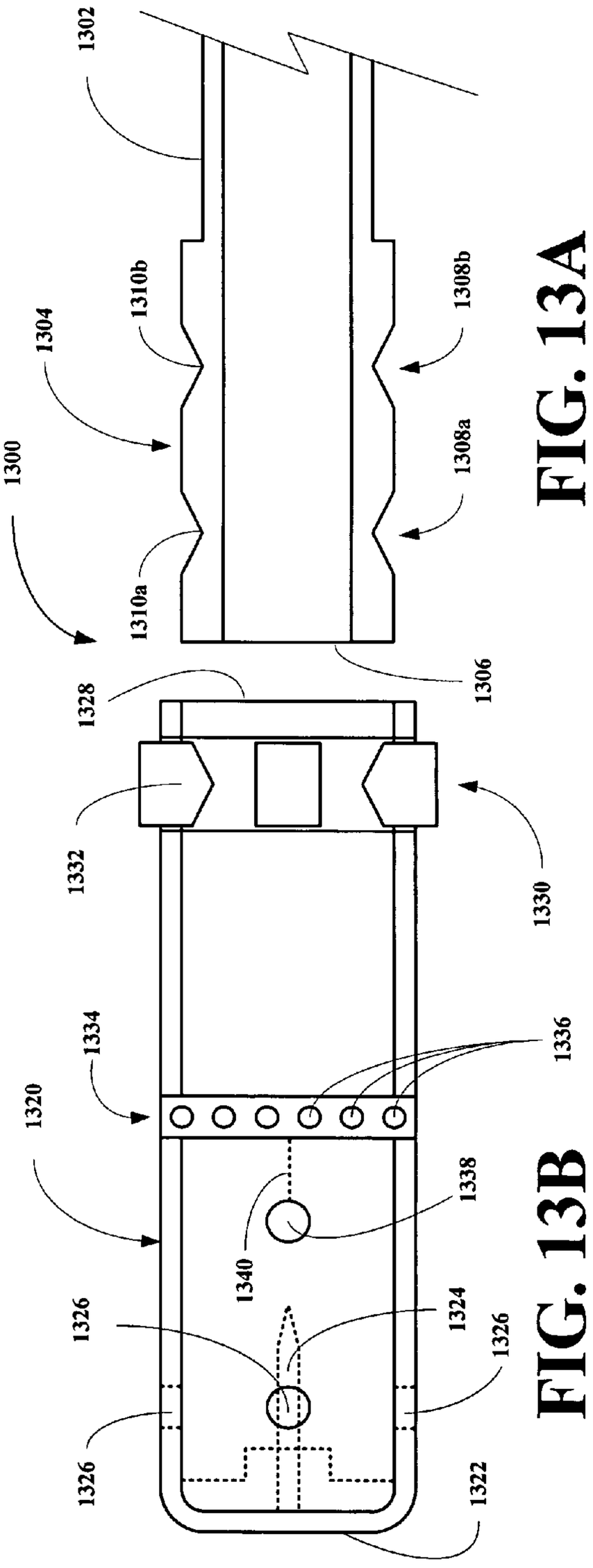


FIG. 13A

FIG. 13B

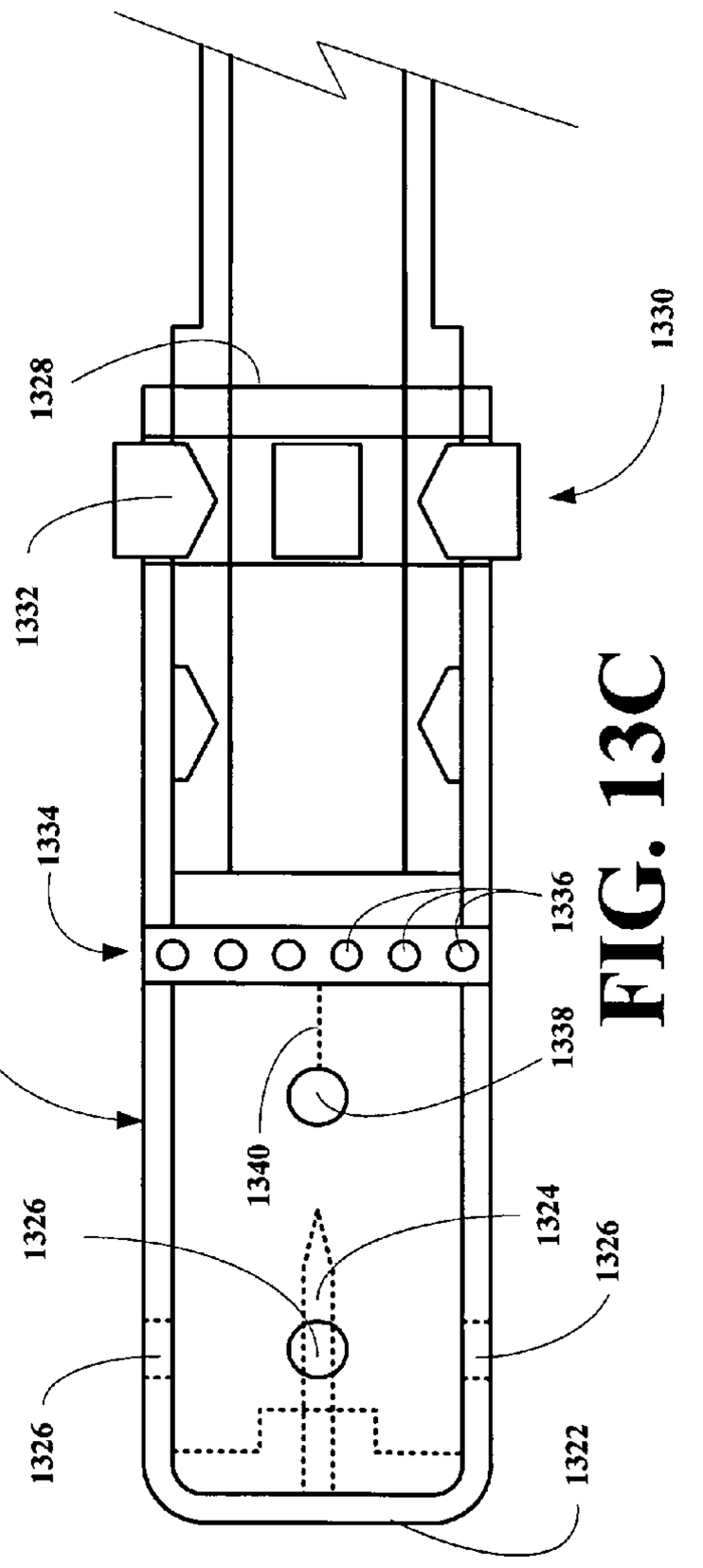


FIG. 13C

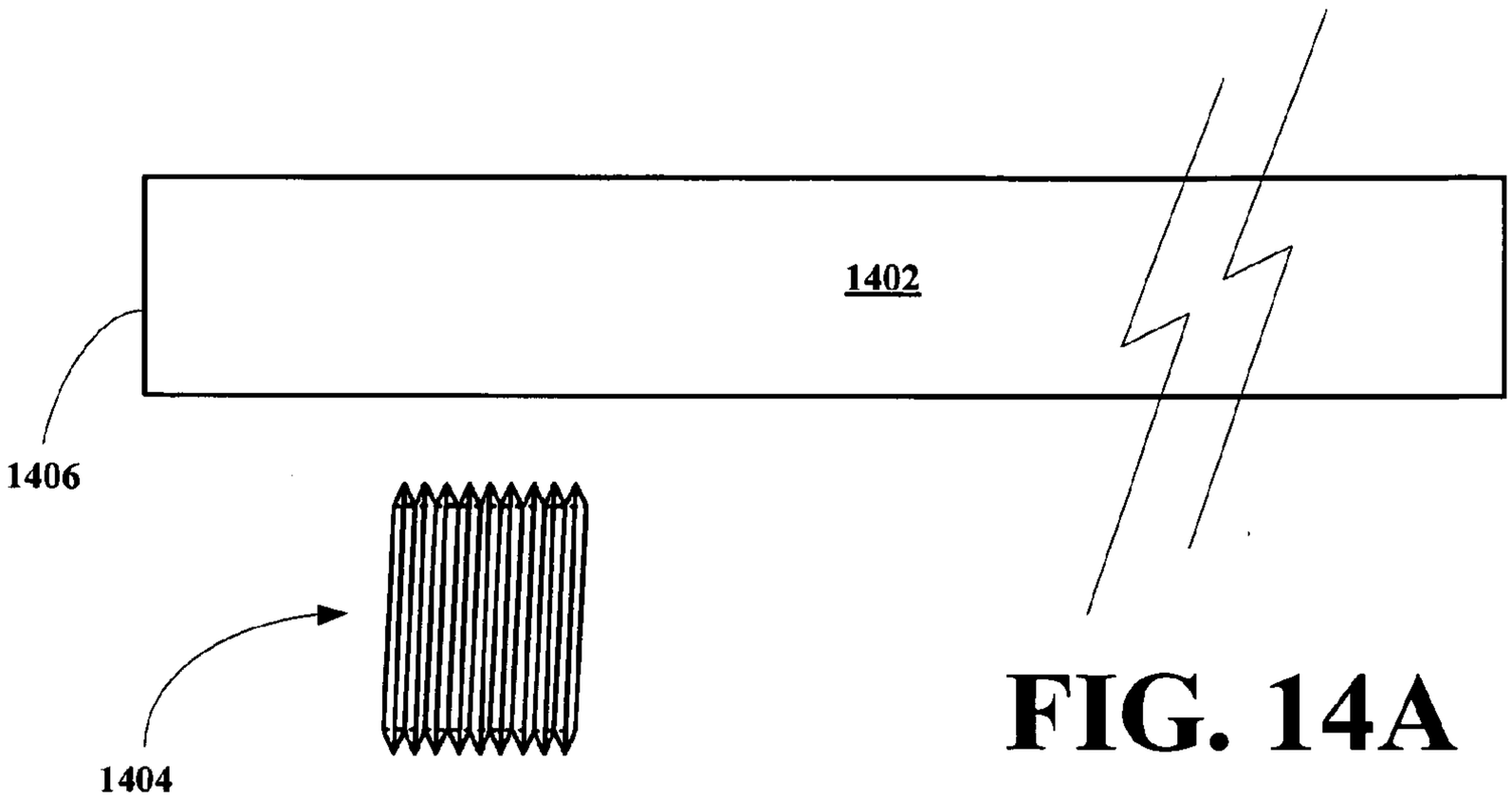


FIG. 14A

FIG. 14B

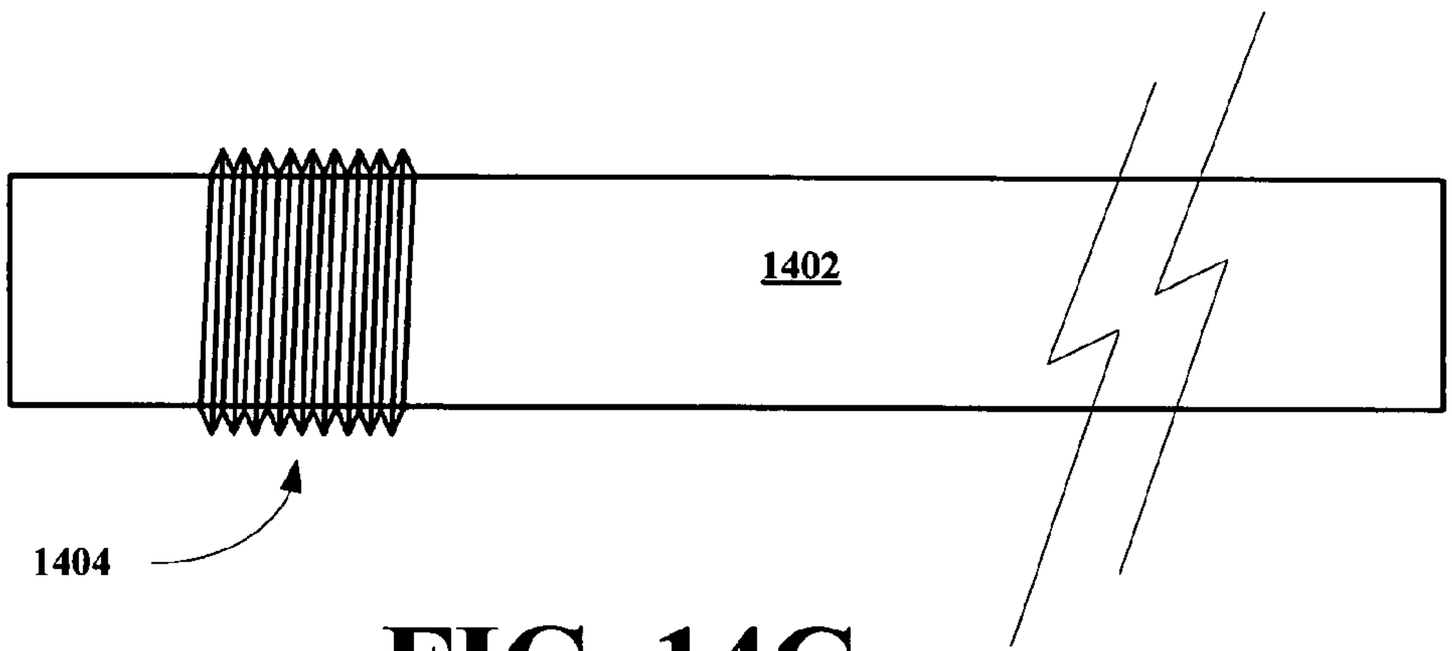


FIG. 14C

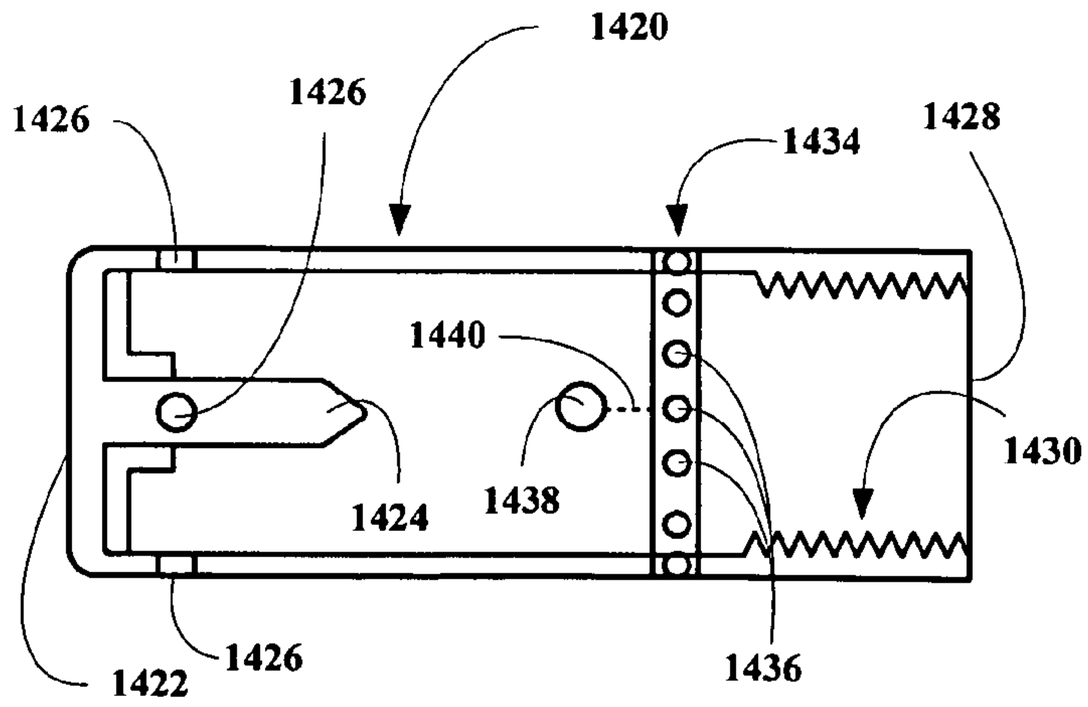


FIG. 14D

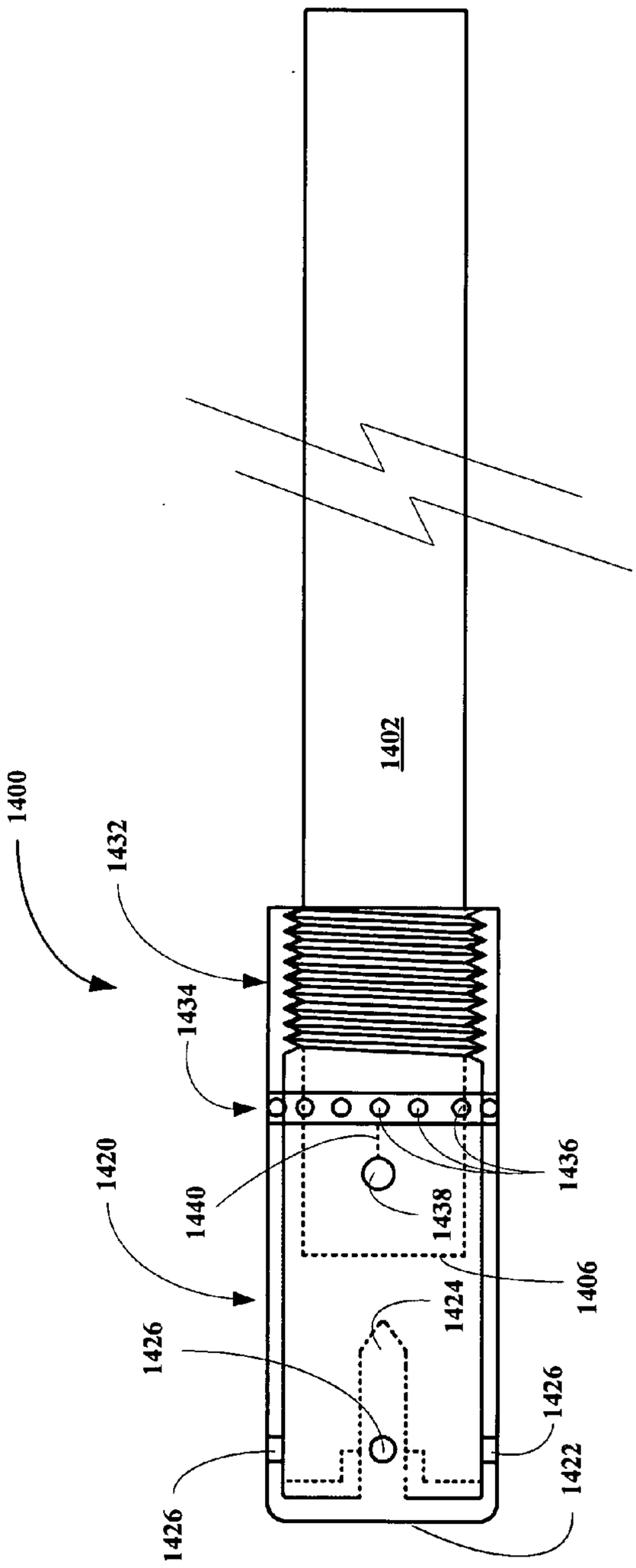

1400
1432
1434
1420
1440
1438
1436
1402
1424
1406
1426
1426
1422
1426

FIG. 14E

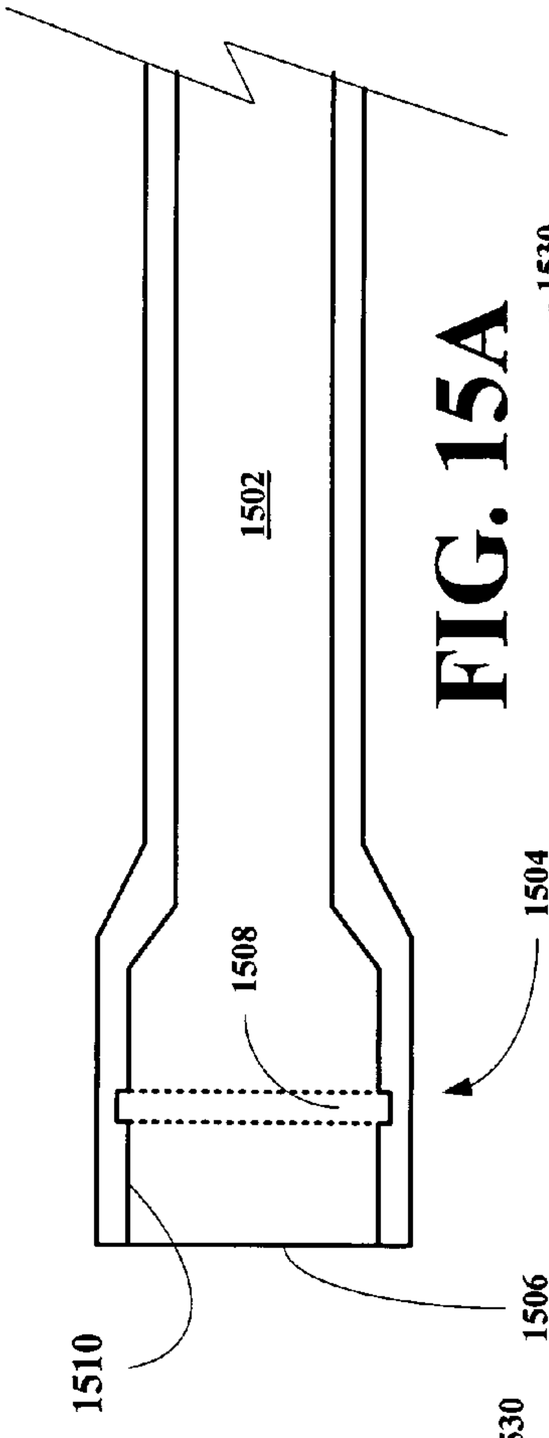


FIG. 15A

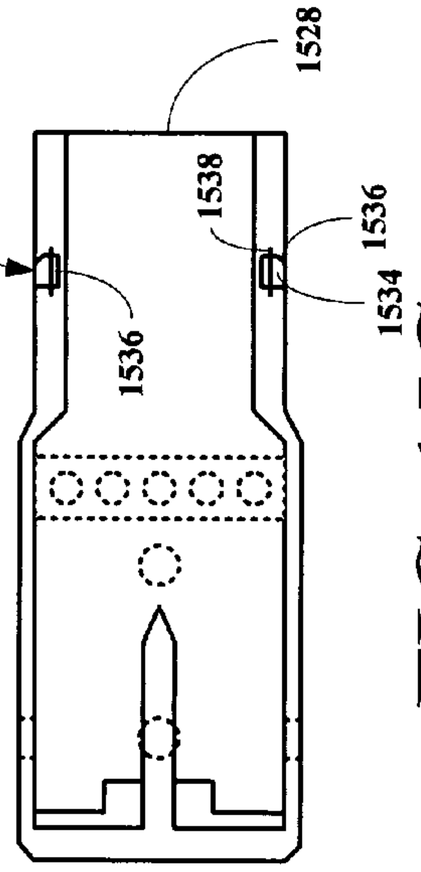


FIG. 15C

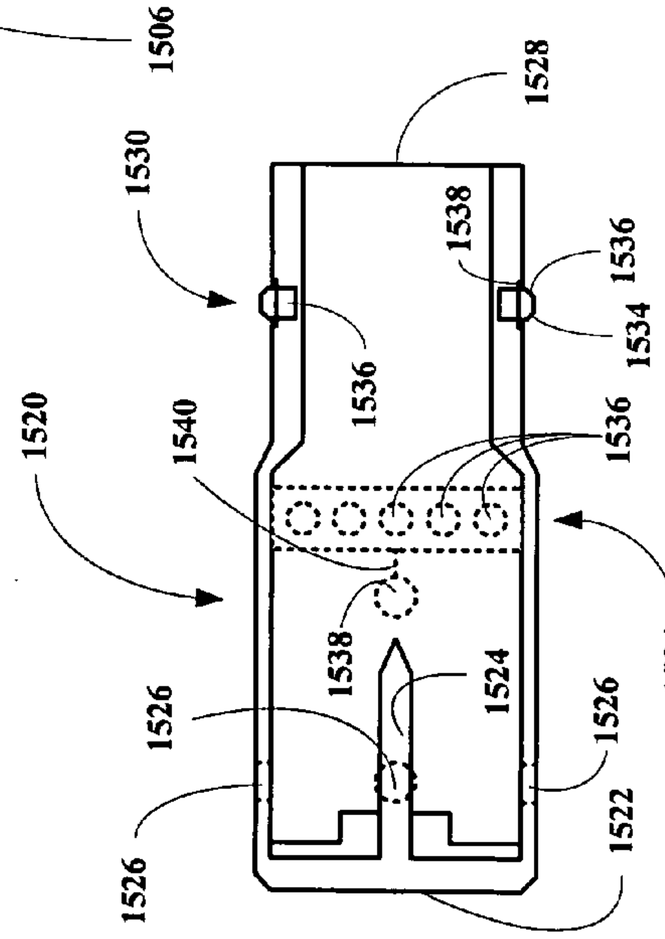


FIG. 15B

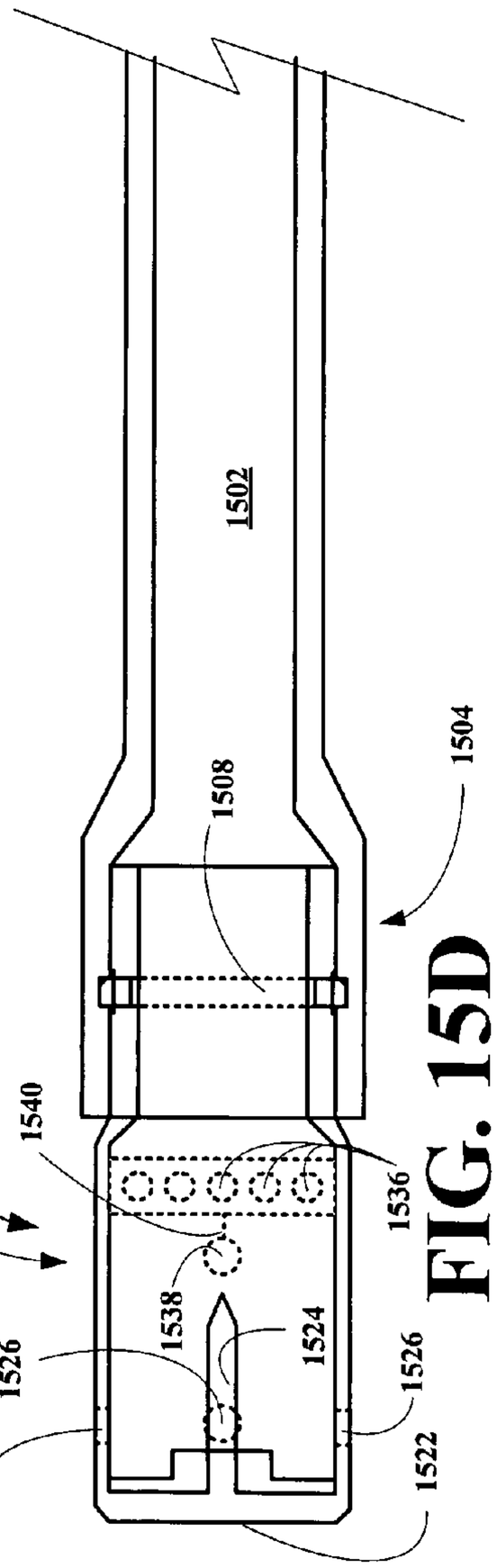


FIG. 15D

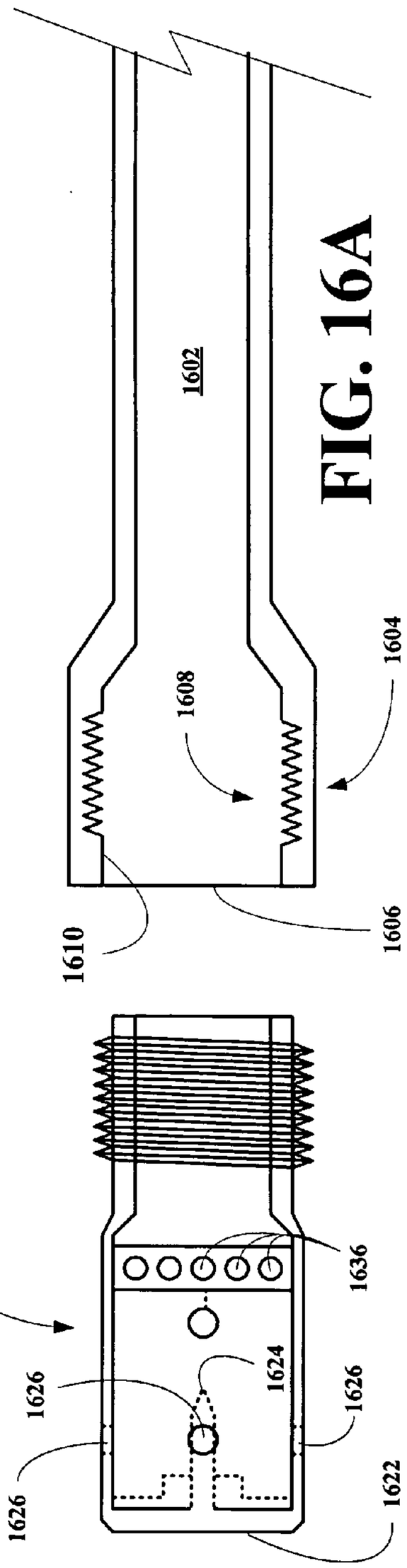


FIG. 16A

FIG. 16B

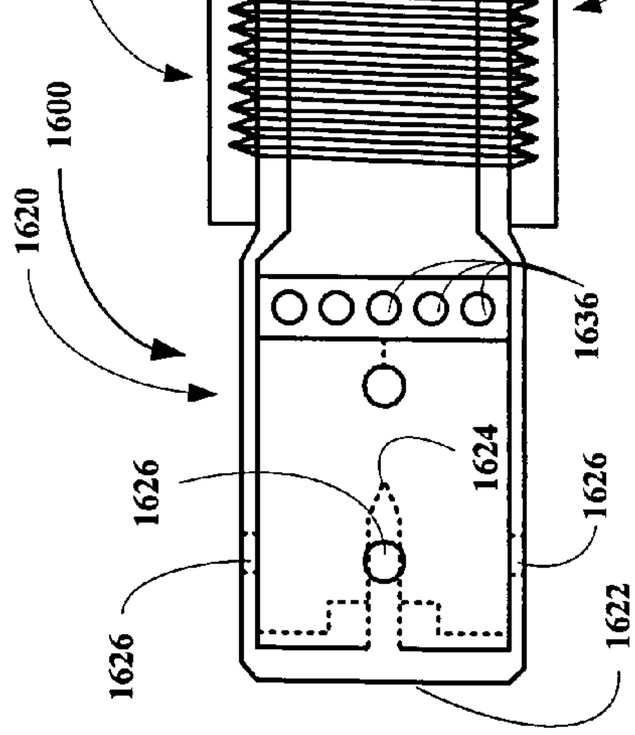


FIG. 16C

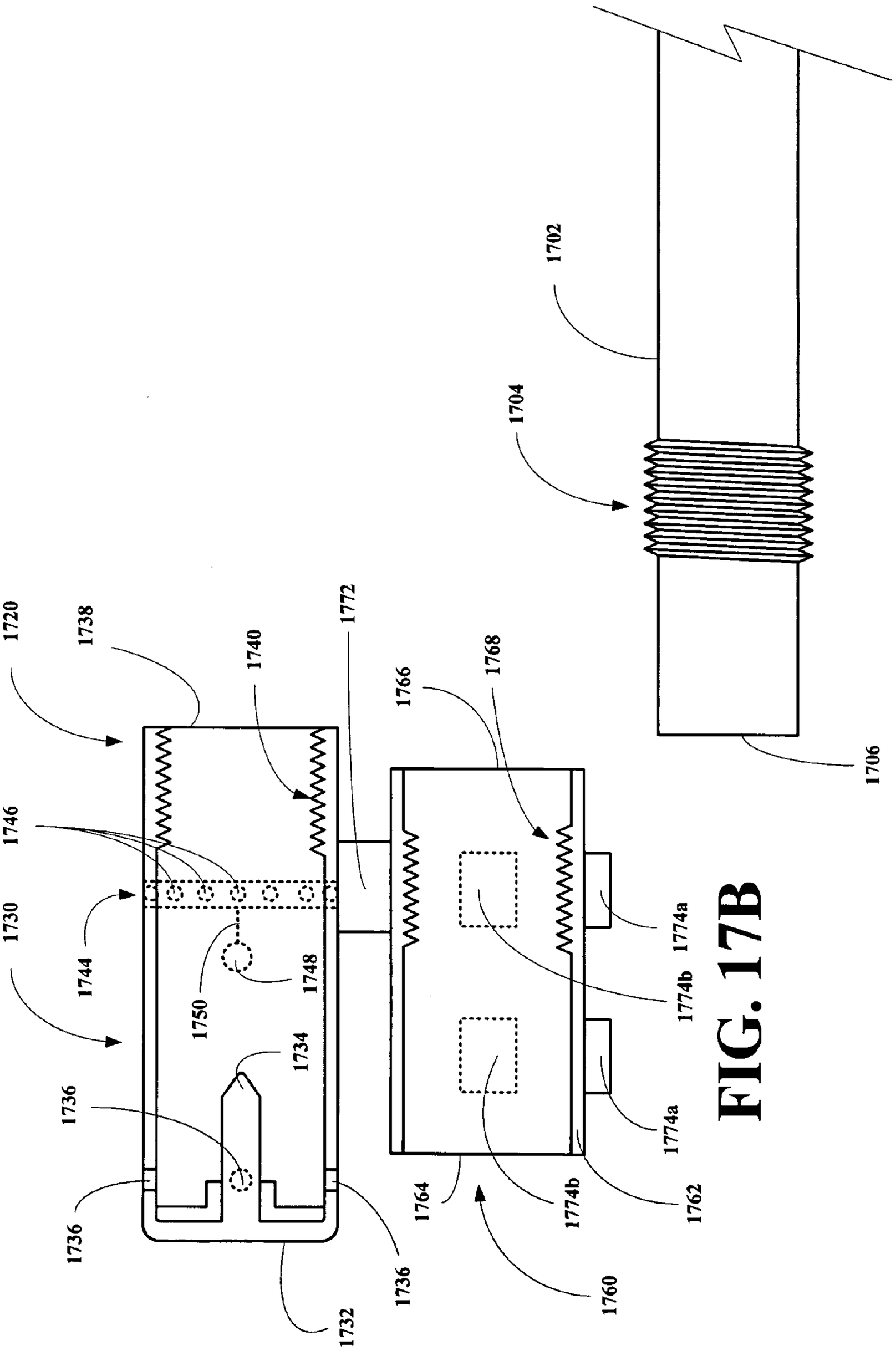


FIG. 17A

FIG. 17B

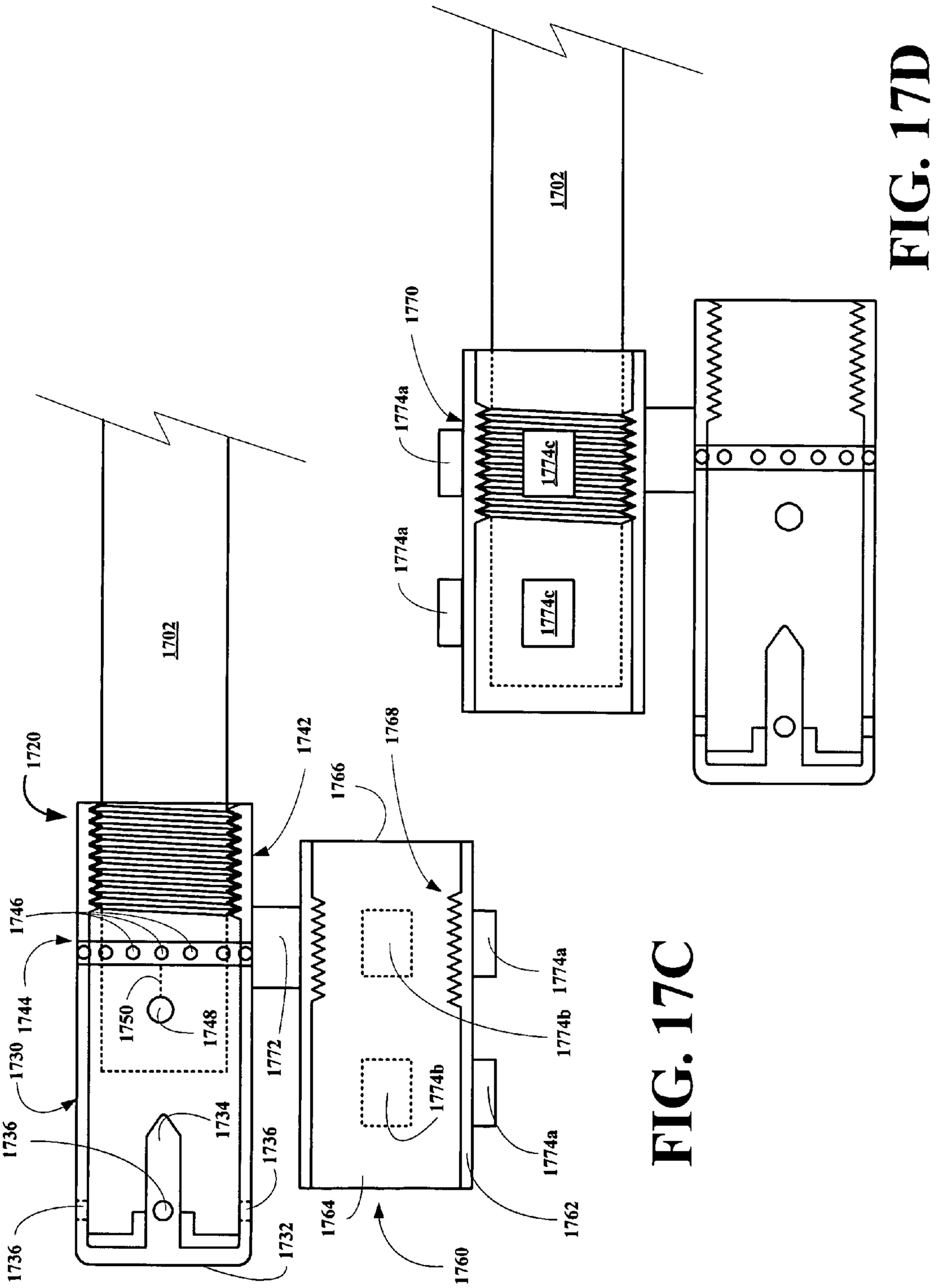


FIG. 17C

FIG. 17D

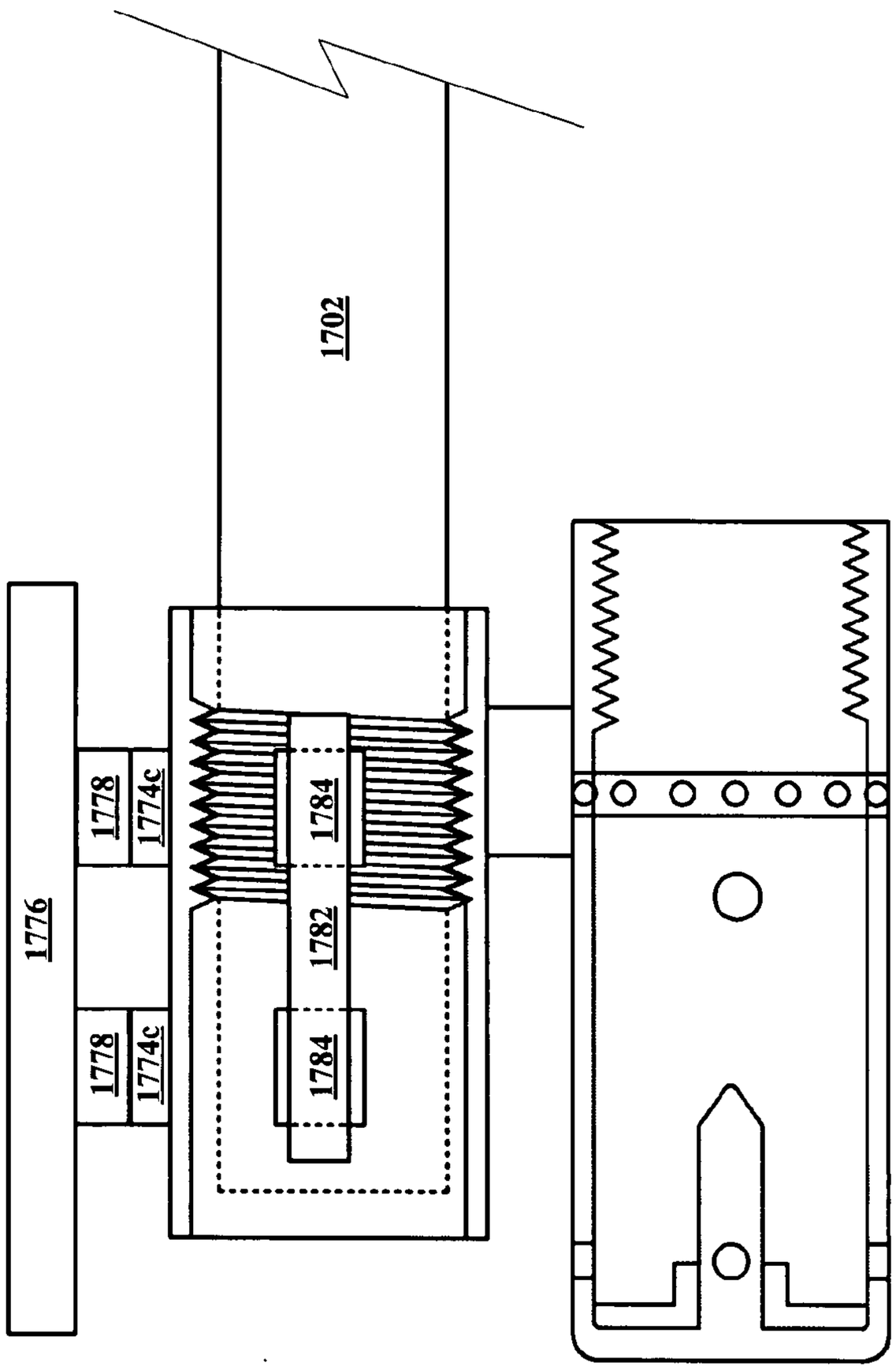


FIG. 17F

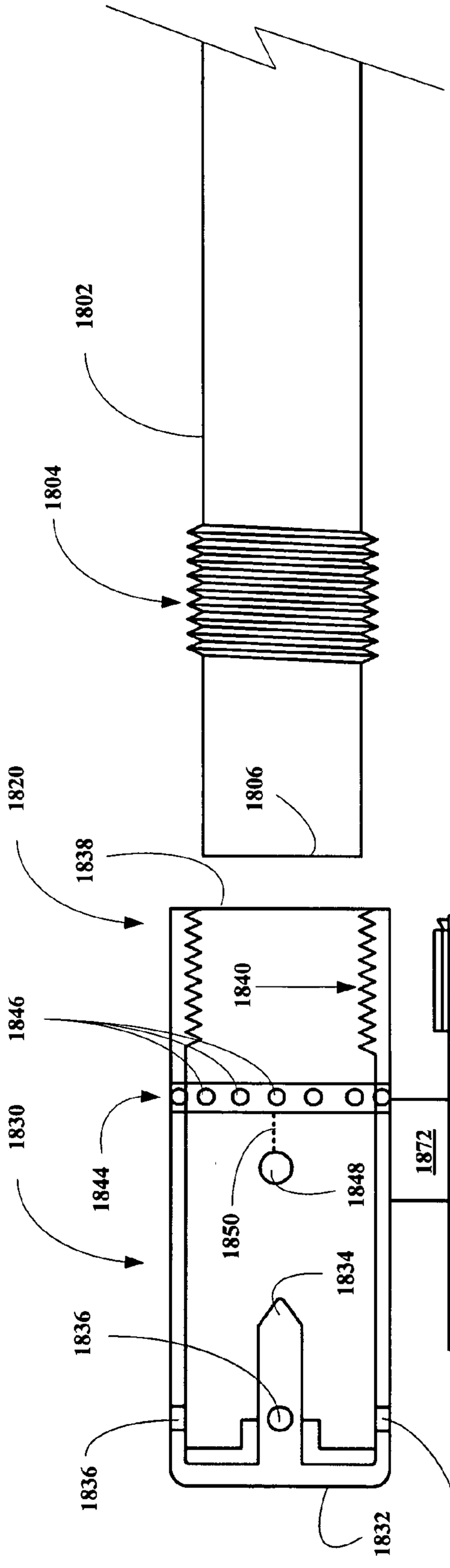


FIG. 18A

FIG. 18B

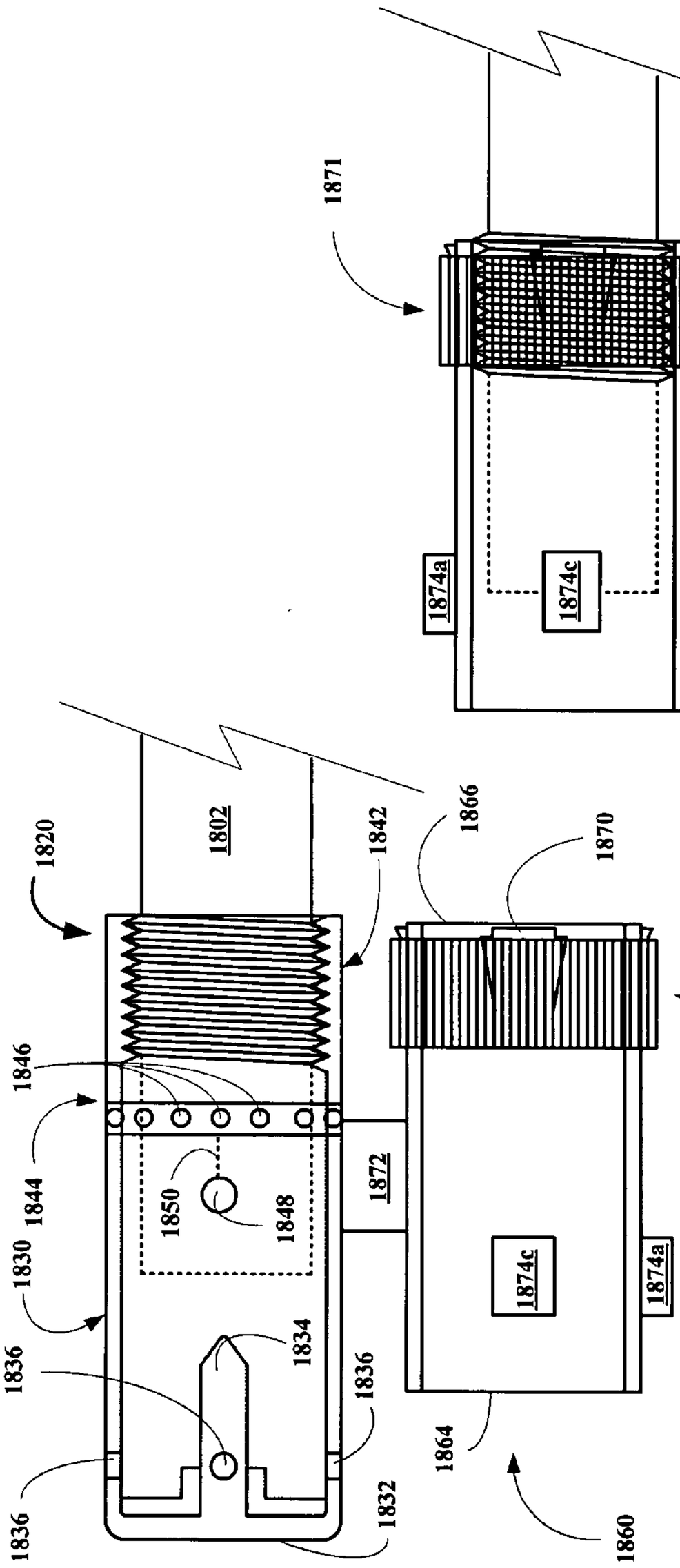


FIG. 18C

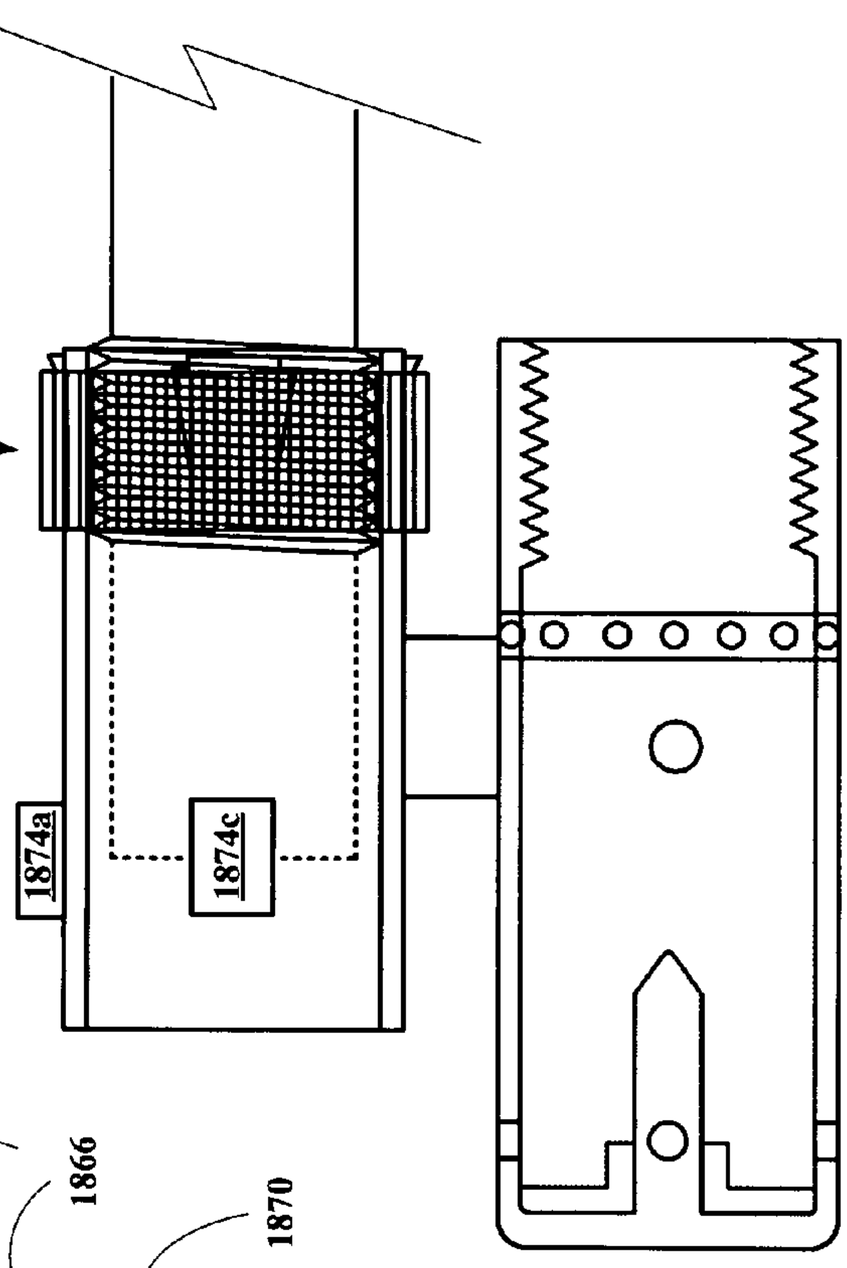


FIG. 18D

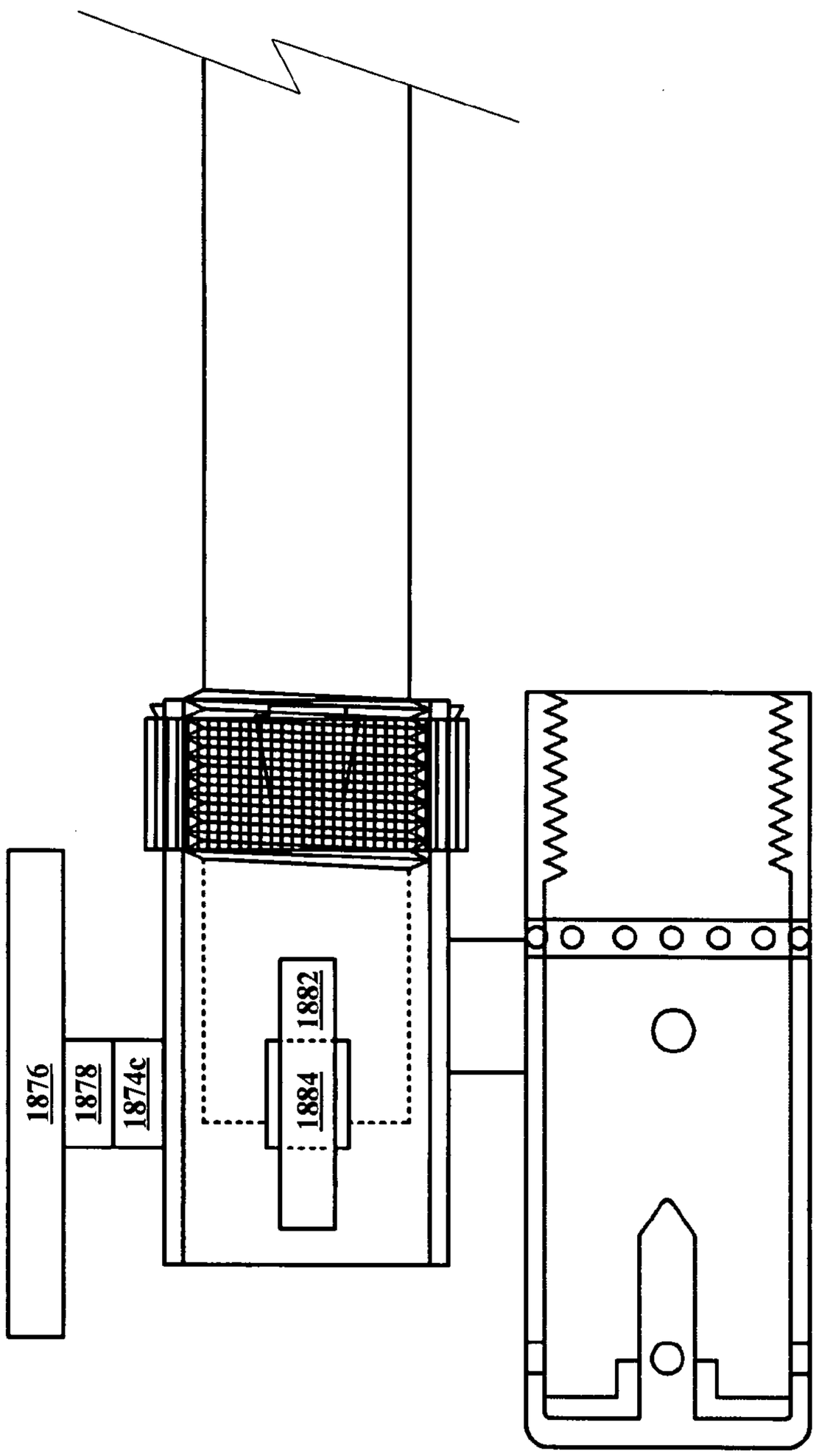


FIG. 18E

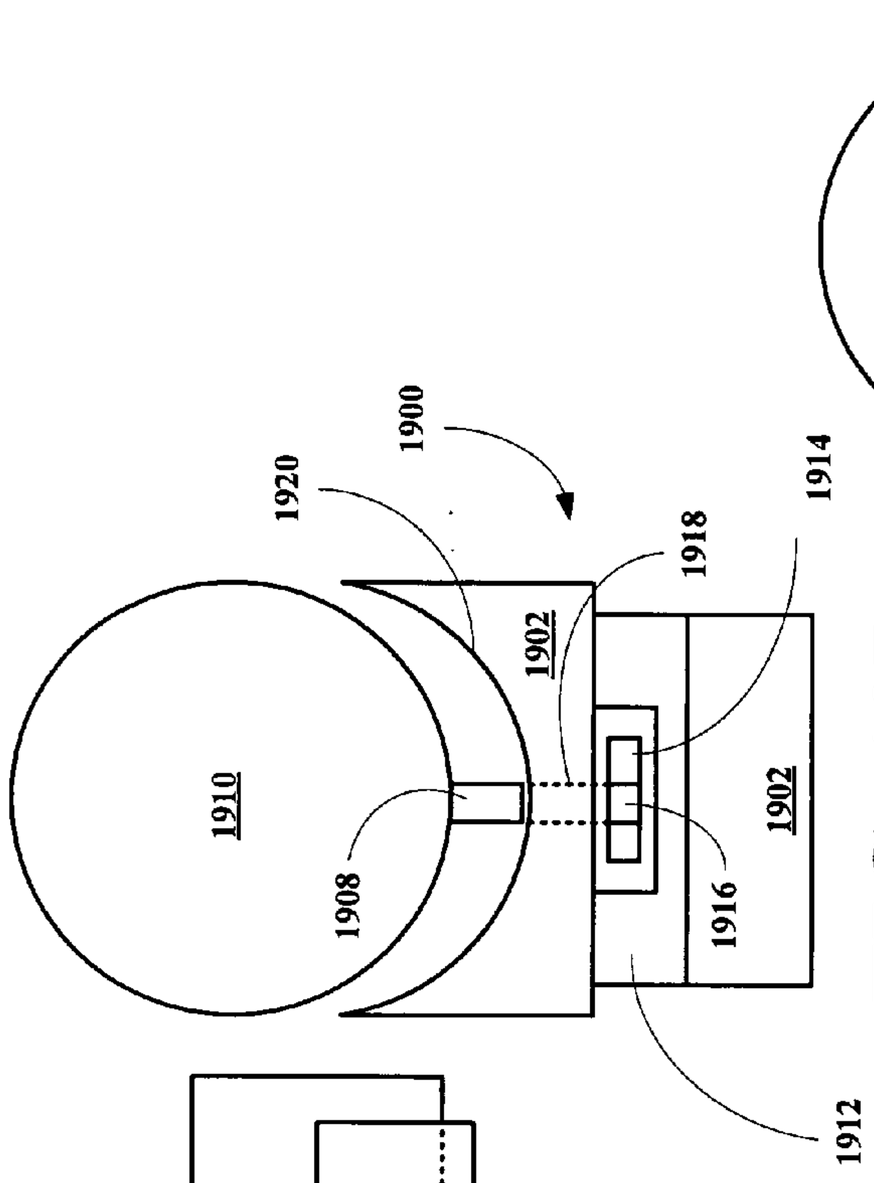


FIG. 19B

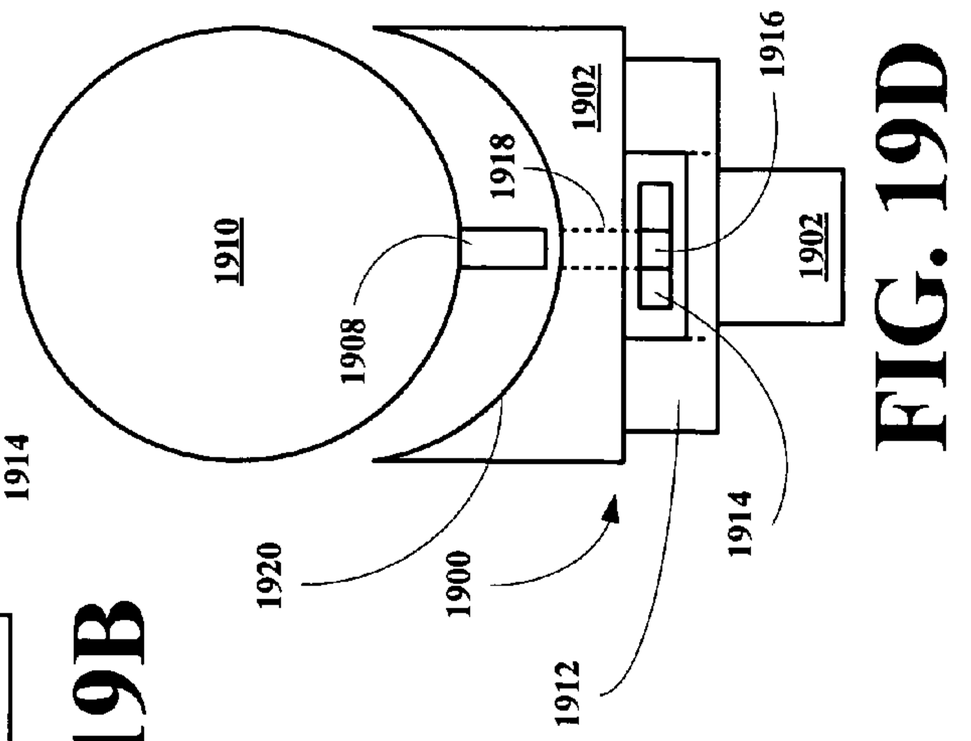


FIG. 19D

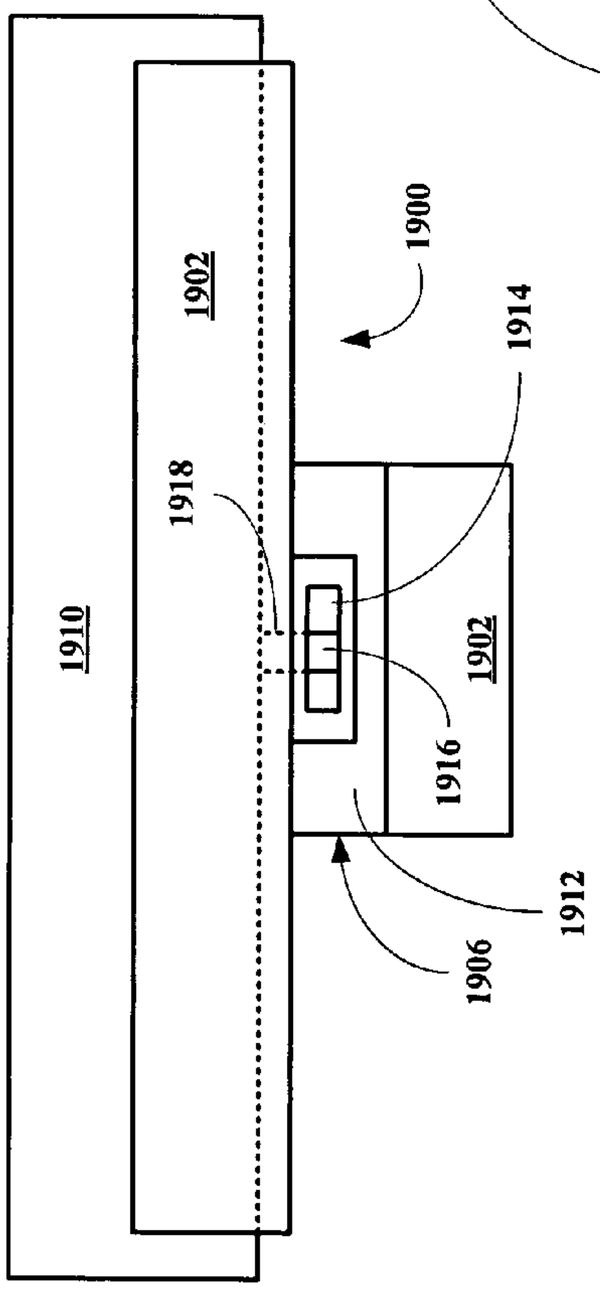


FIG. 19A

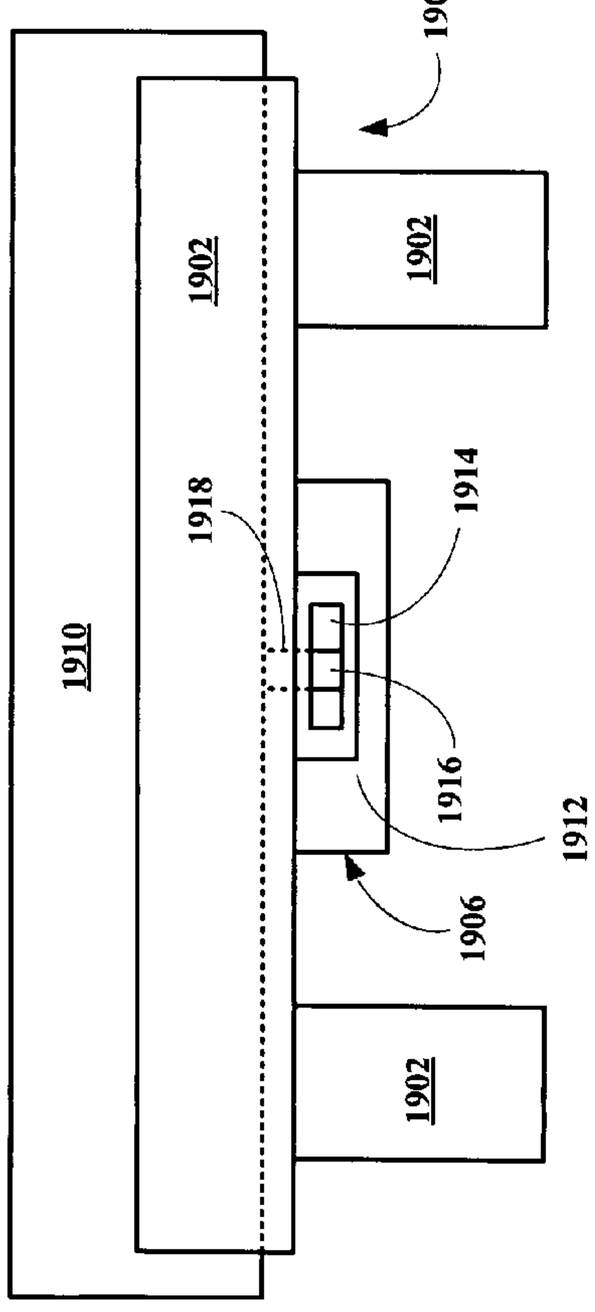


FIG. 19C

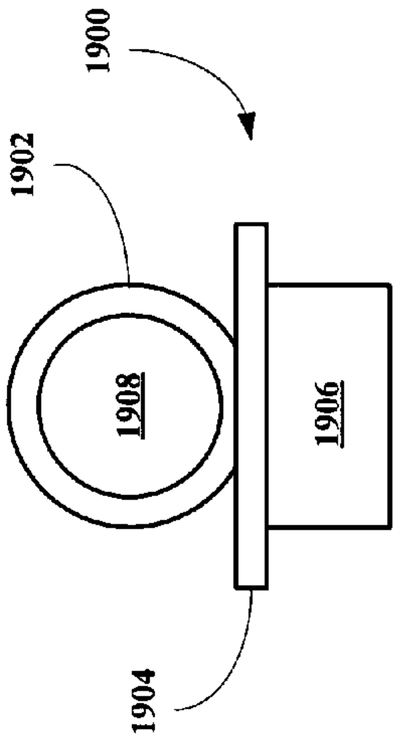


FIG. 19F

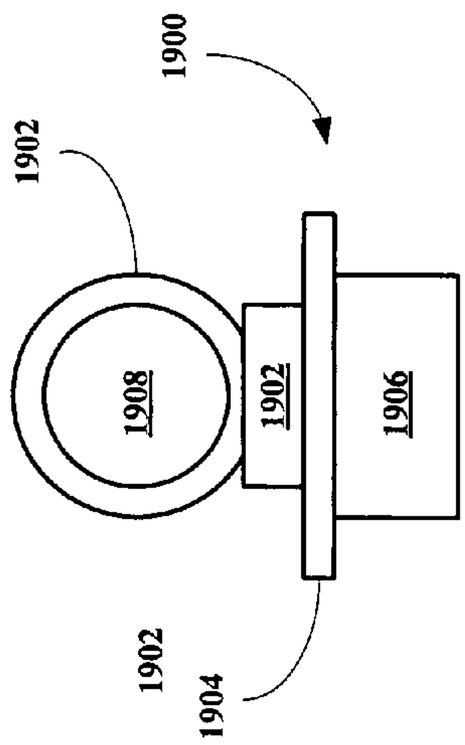


FIG. 19H

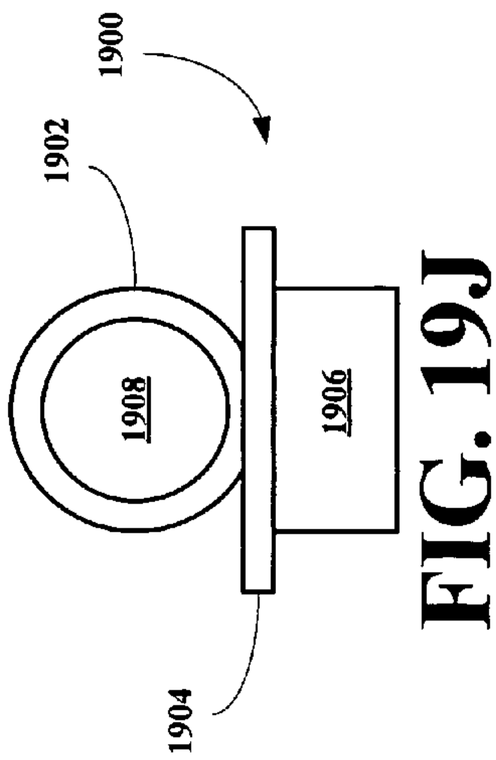


FIG. 19J

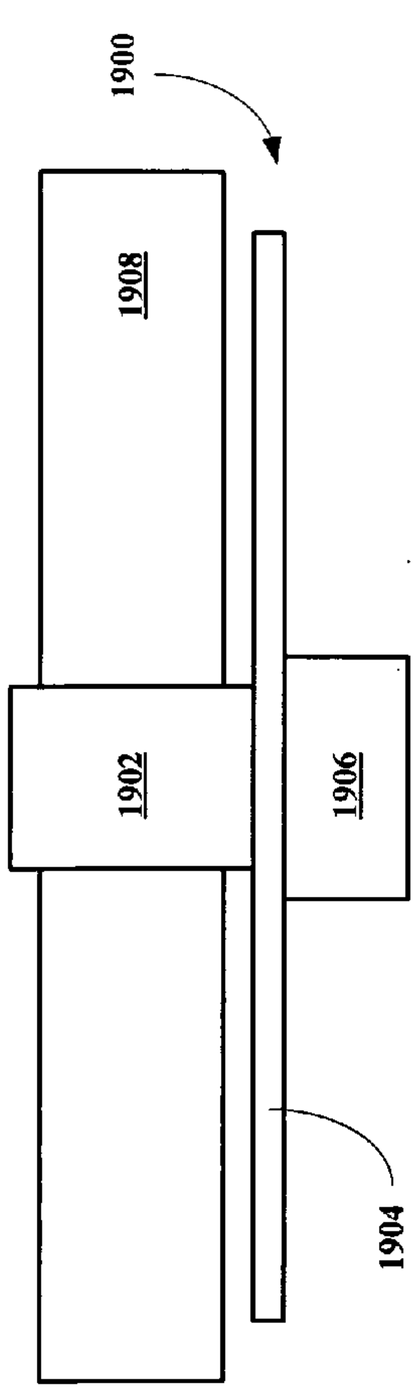


FIG. 19E

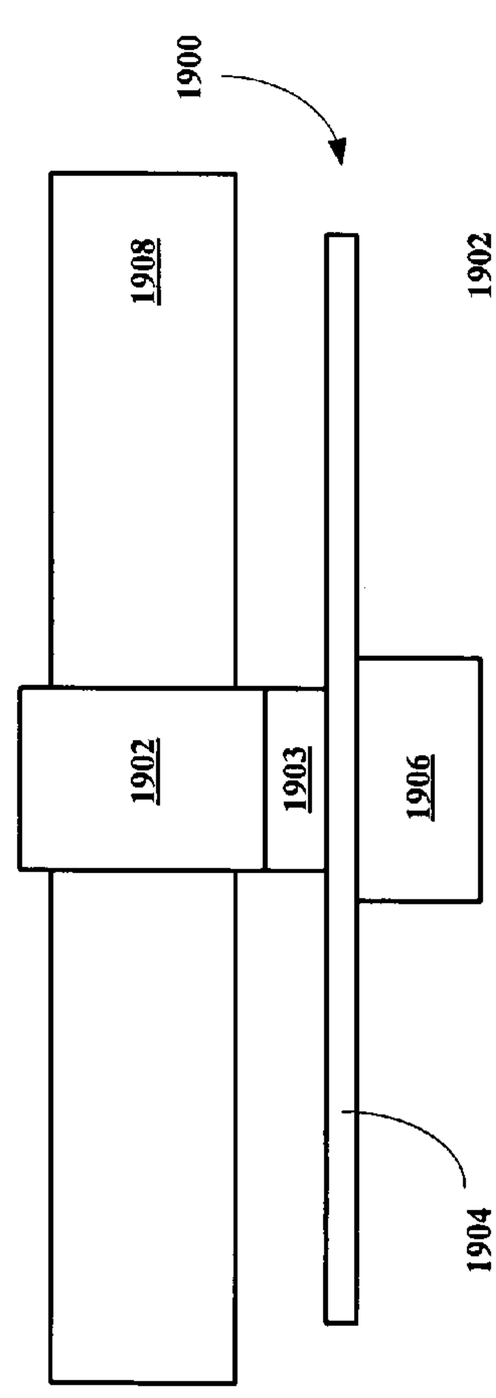


FIG. 19G

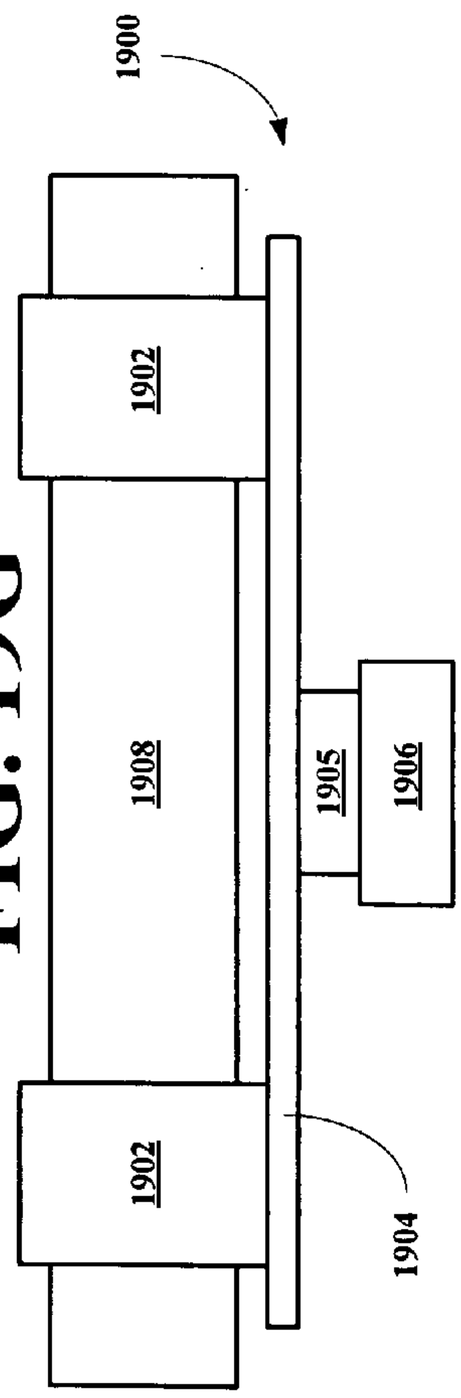


FIG. 19I

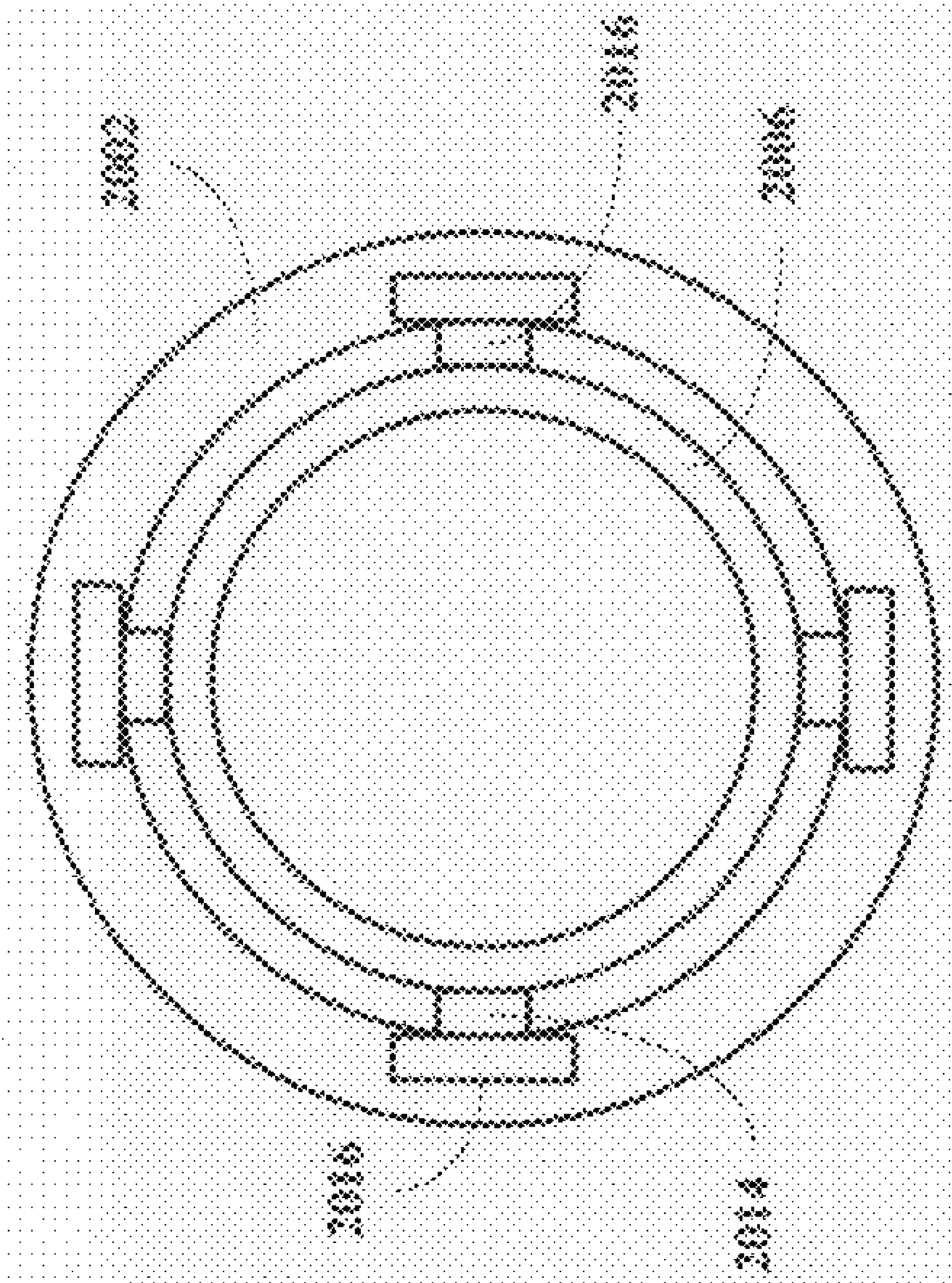


FIG. 20B

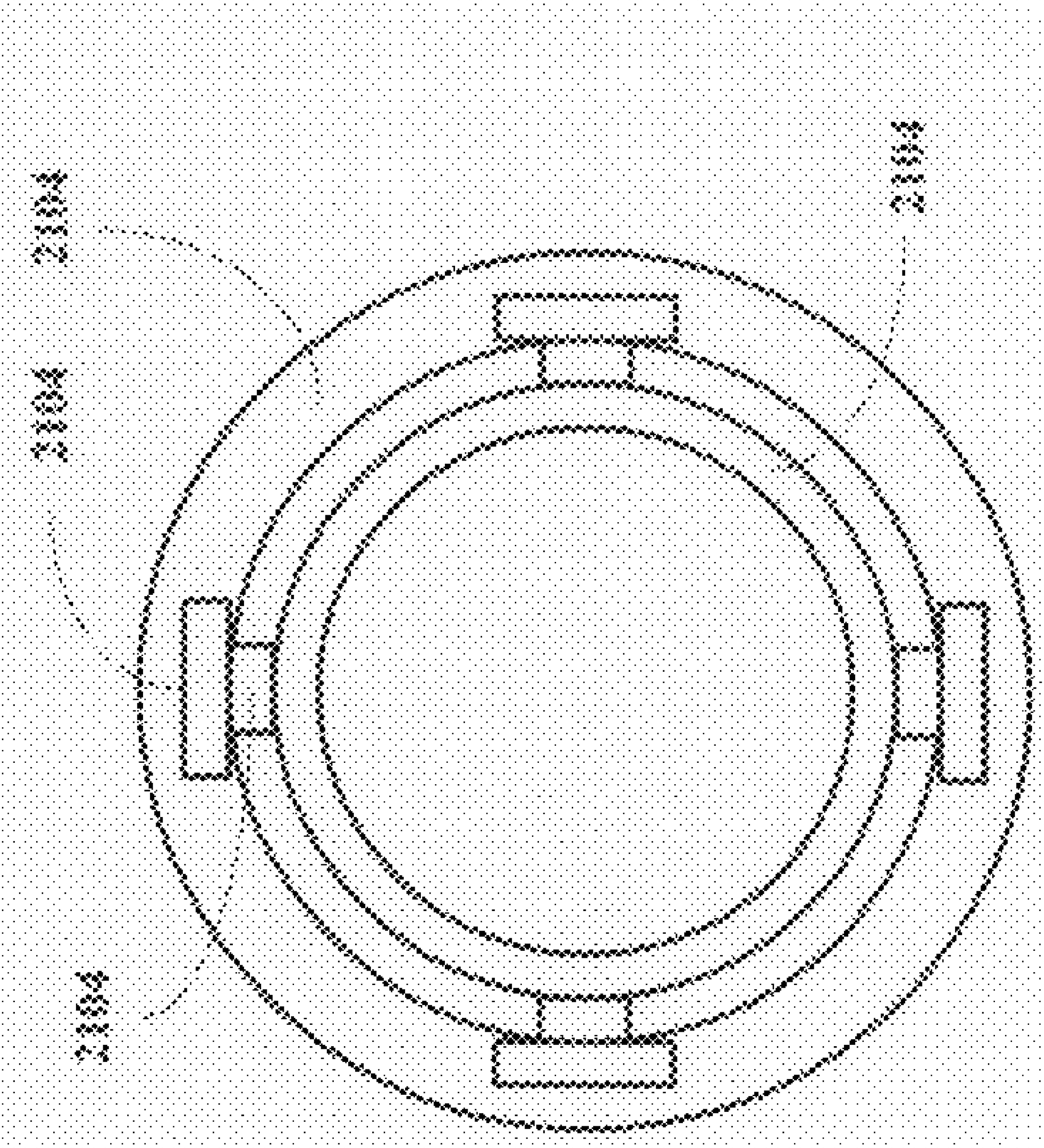


FIG. 21B

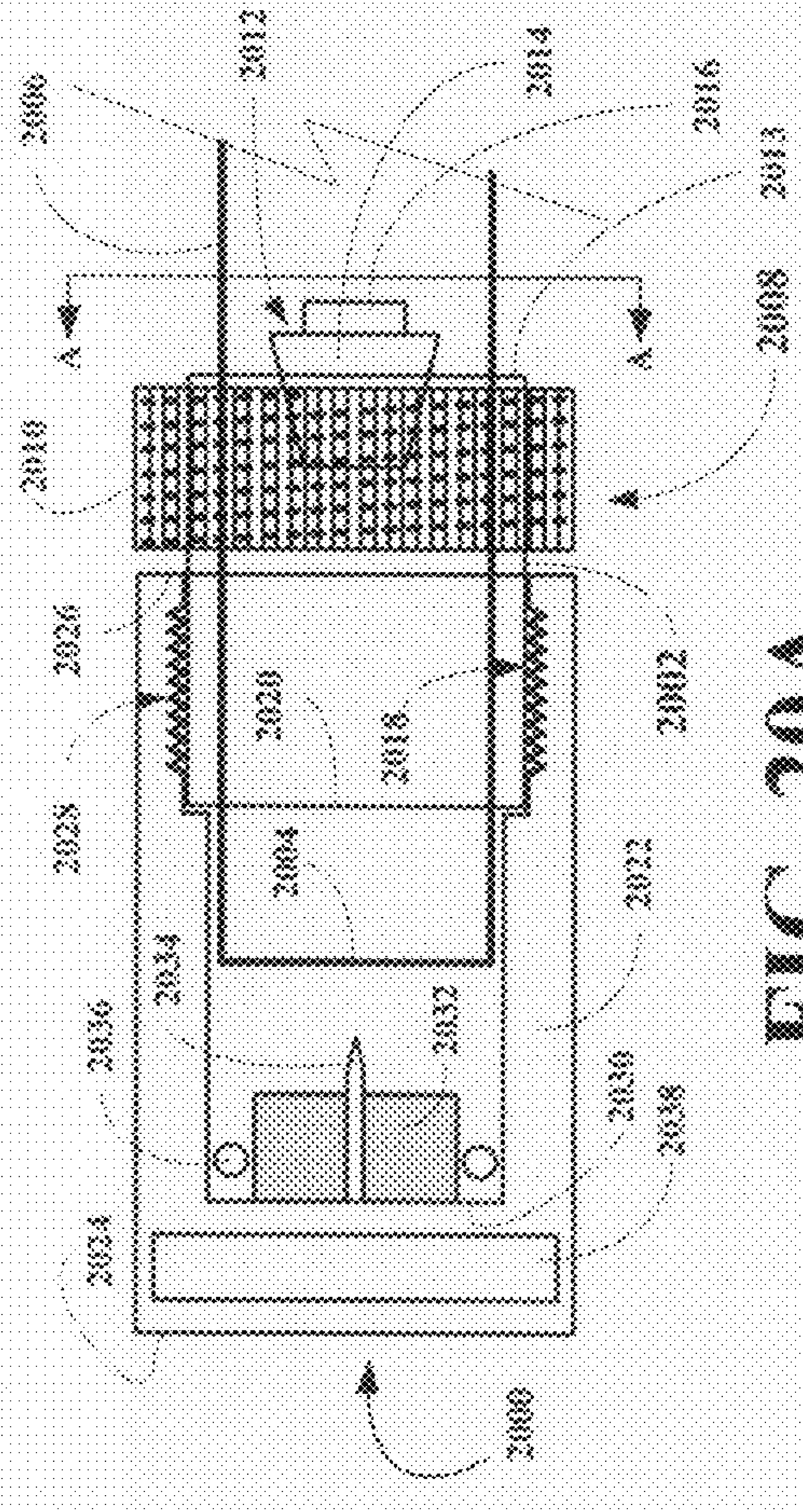


FIG. 20A

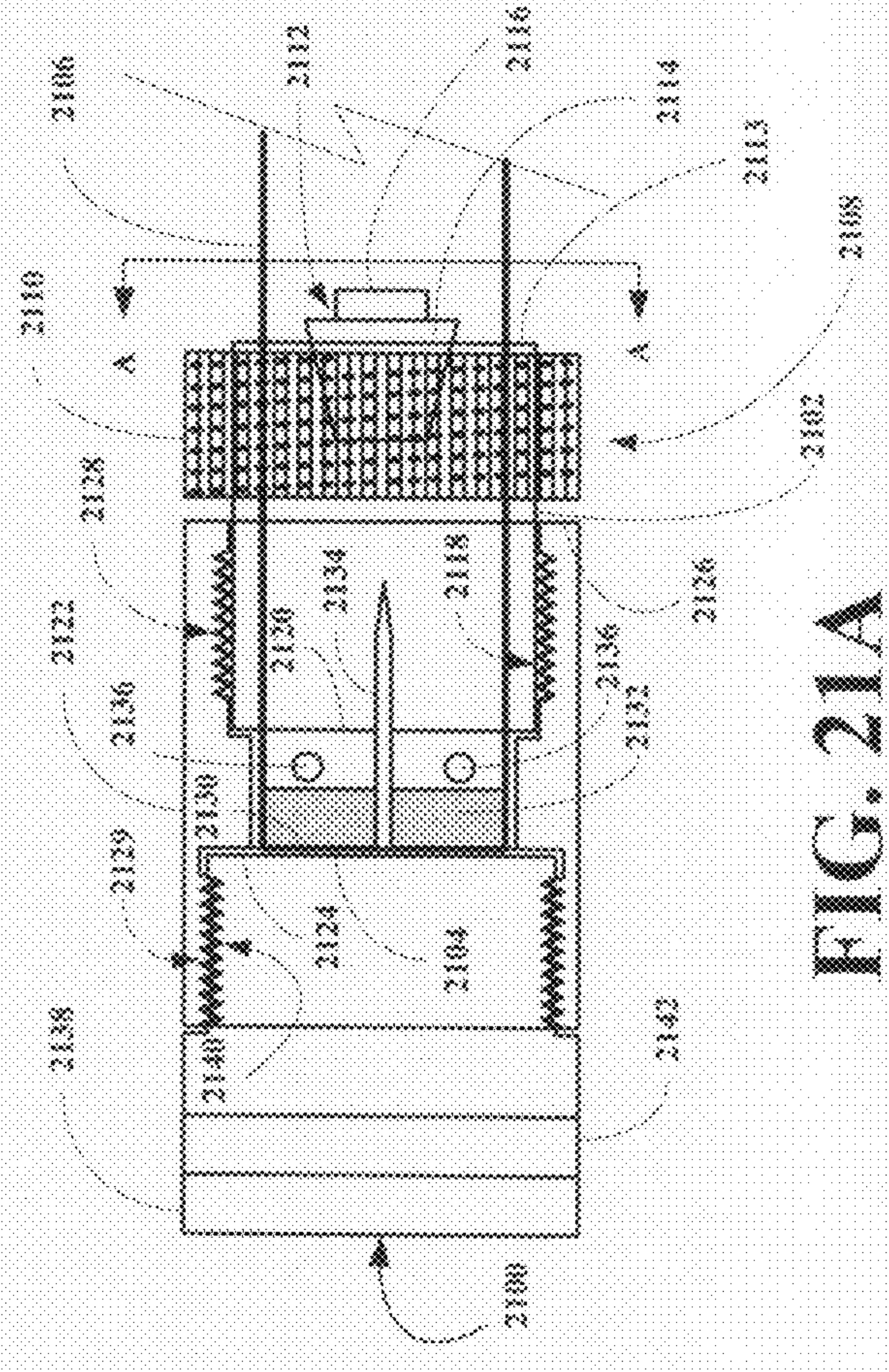


FIG. 21A

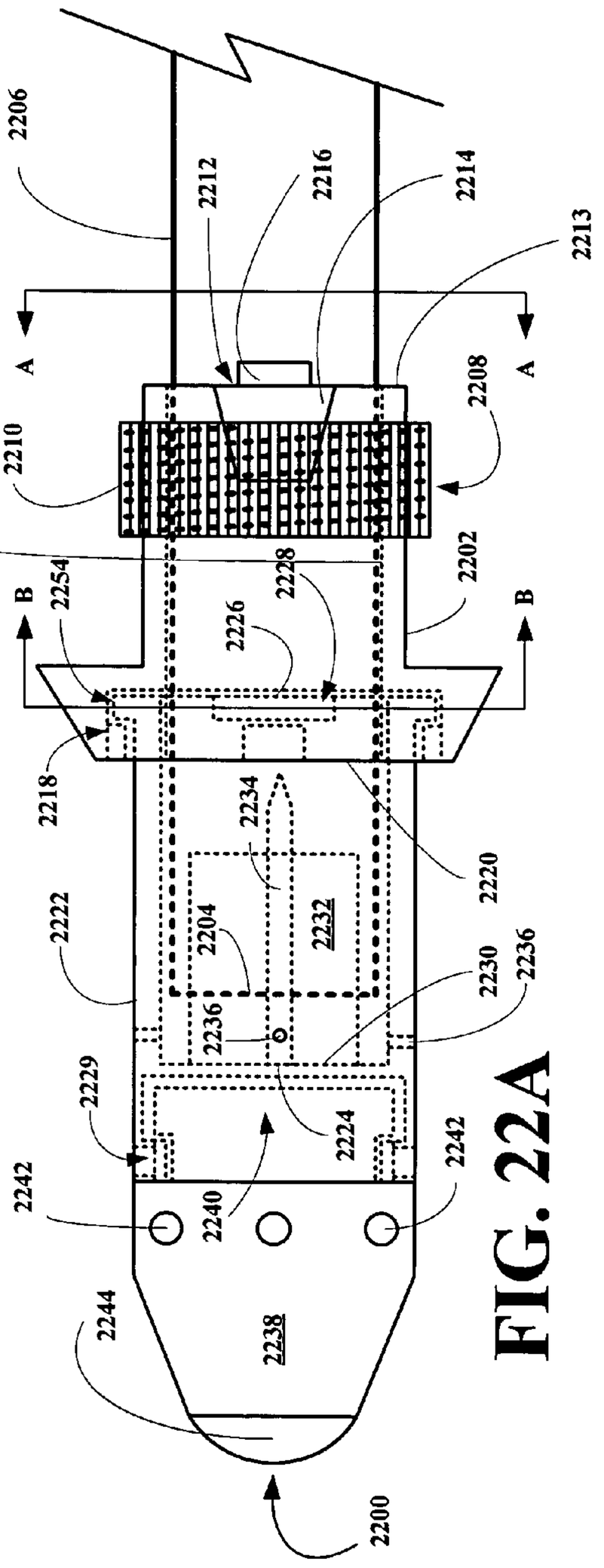


FIG. 22A

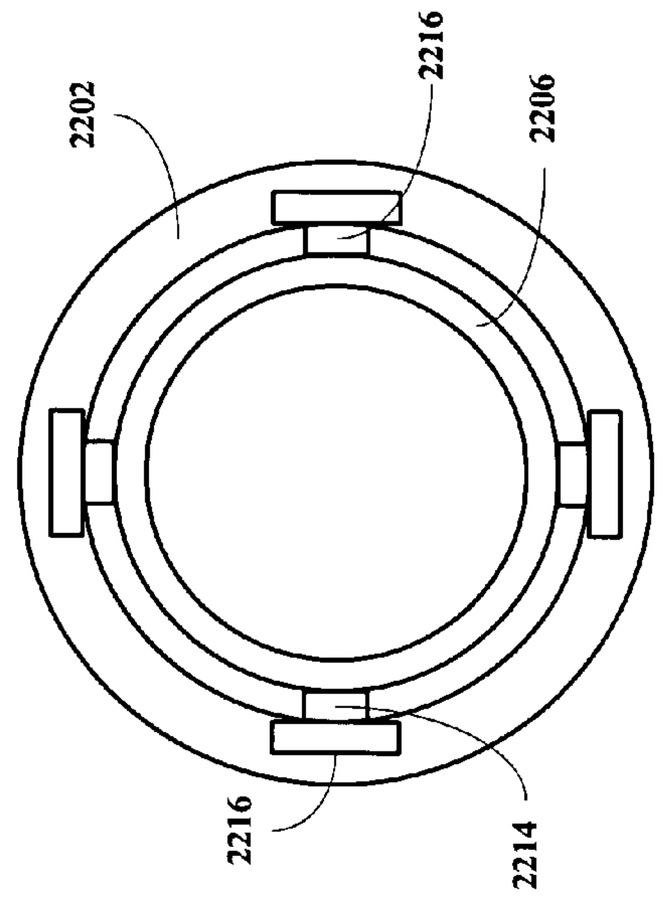


FIG. 22B

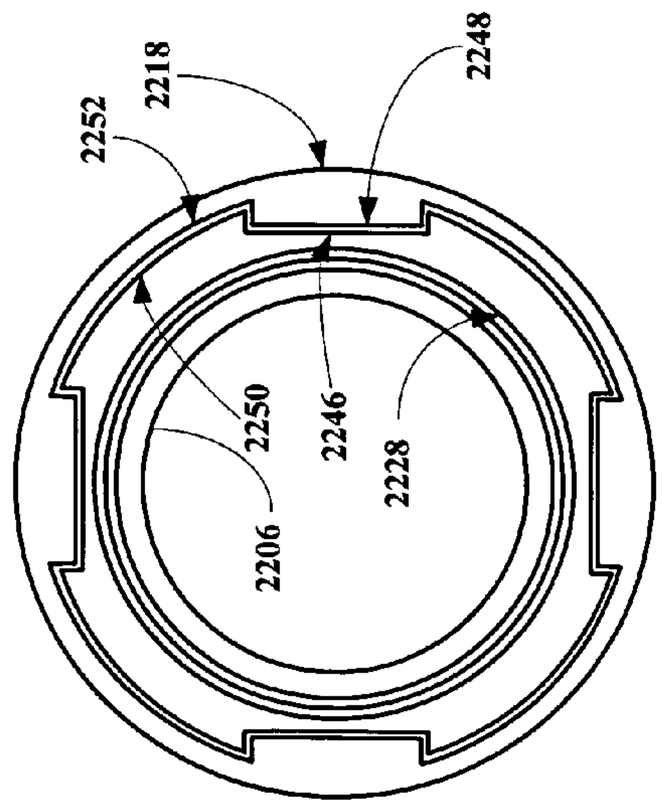


FIG. 22C

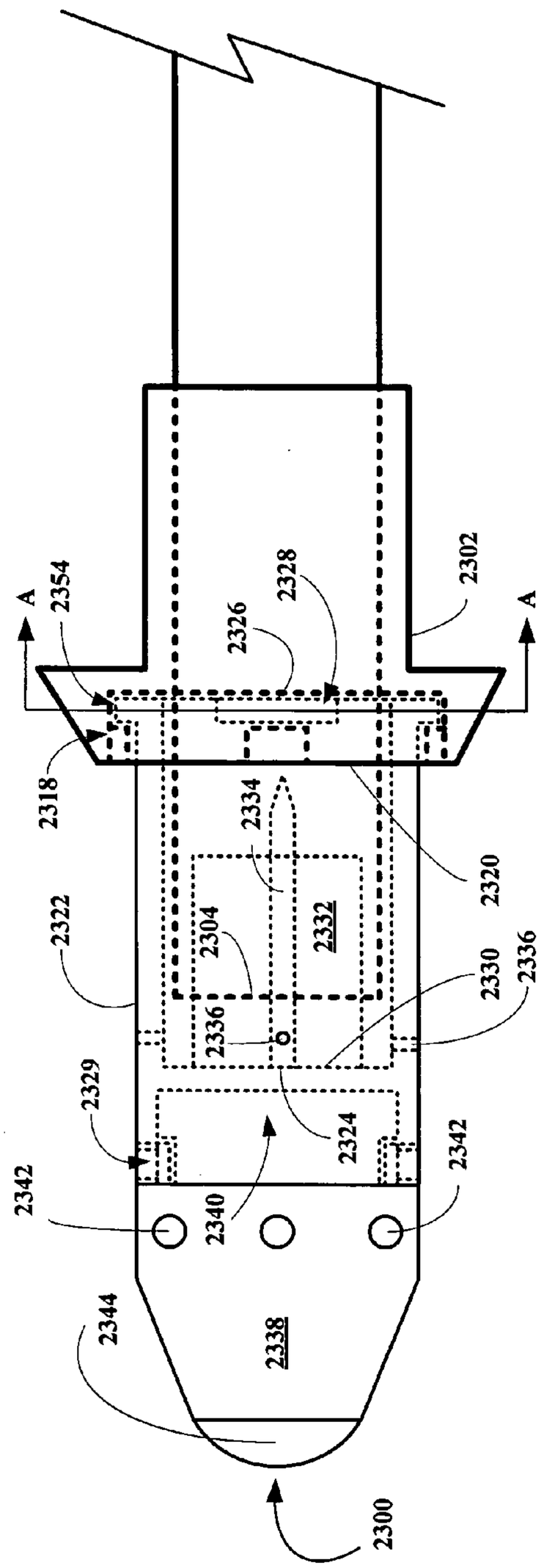


FIG. 23A

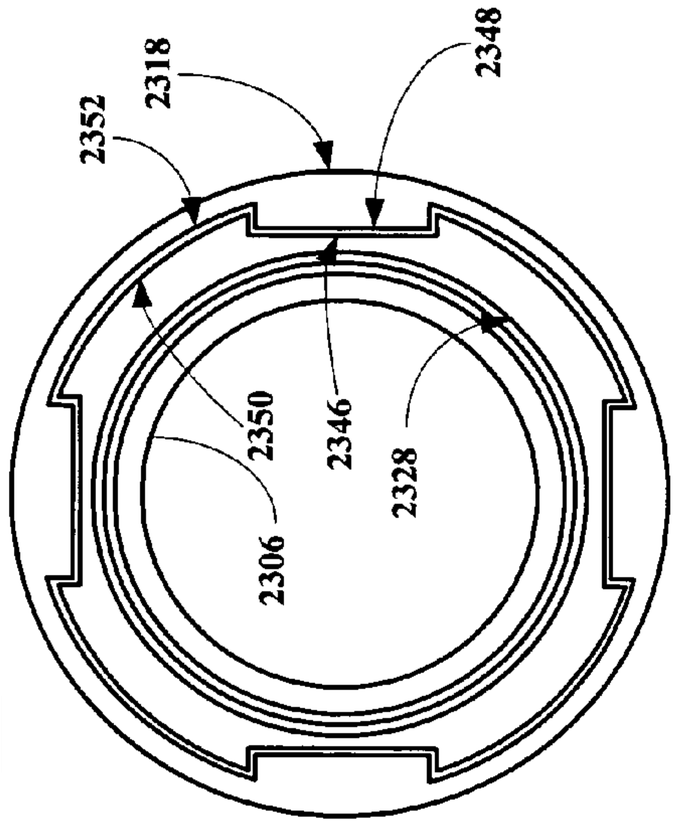


FIG. 23B

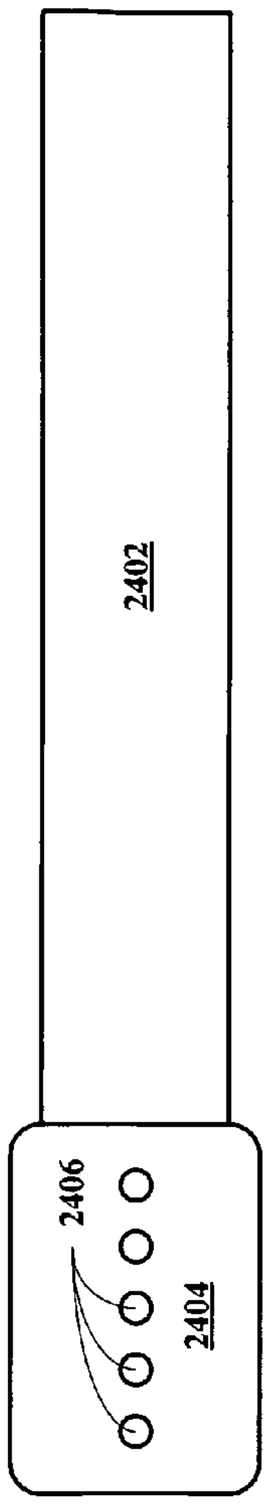


FIG. 24A

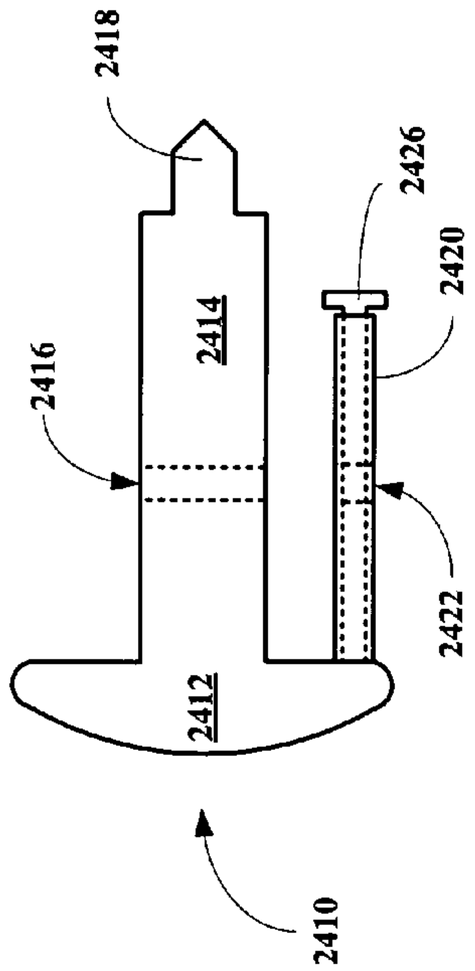


FIG. 24B

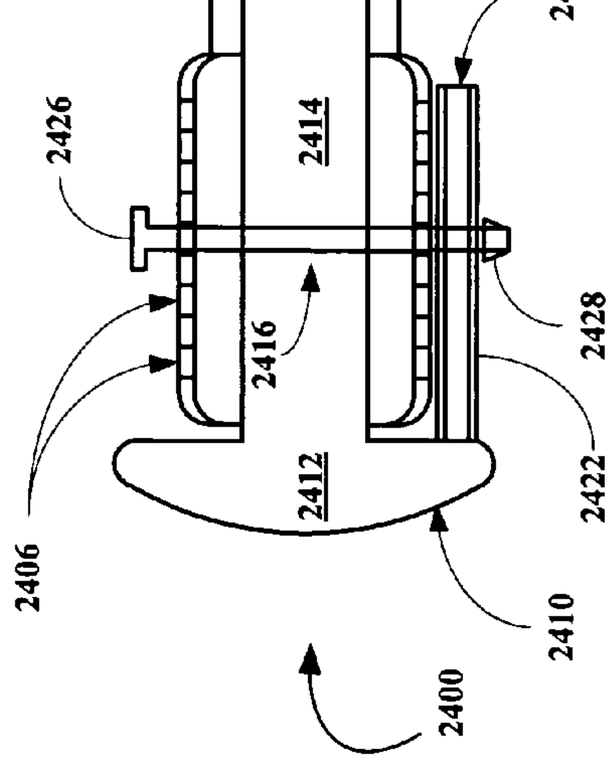


FIG. 24C

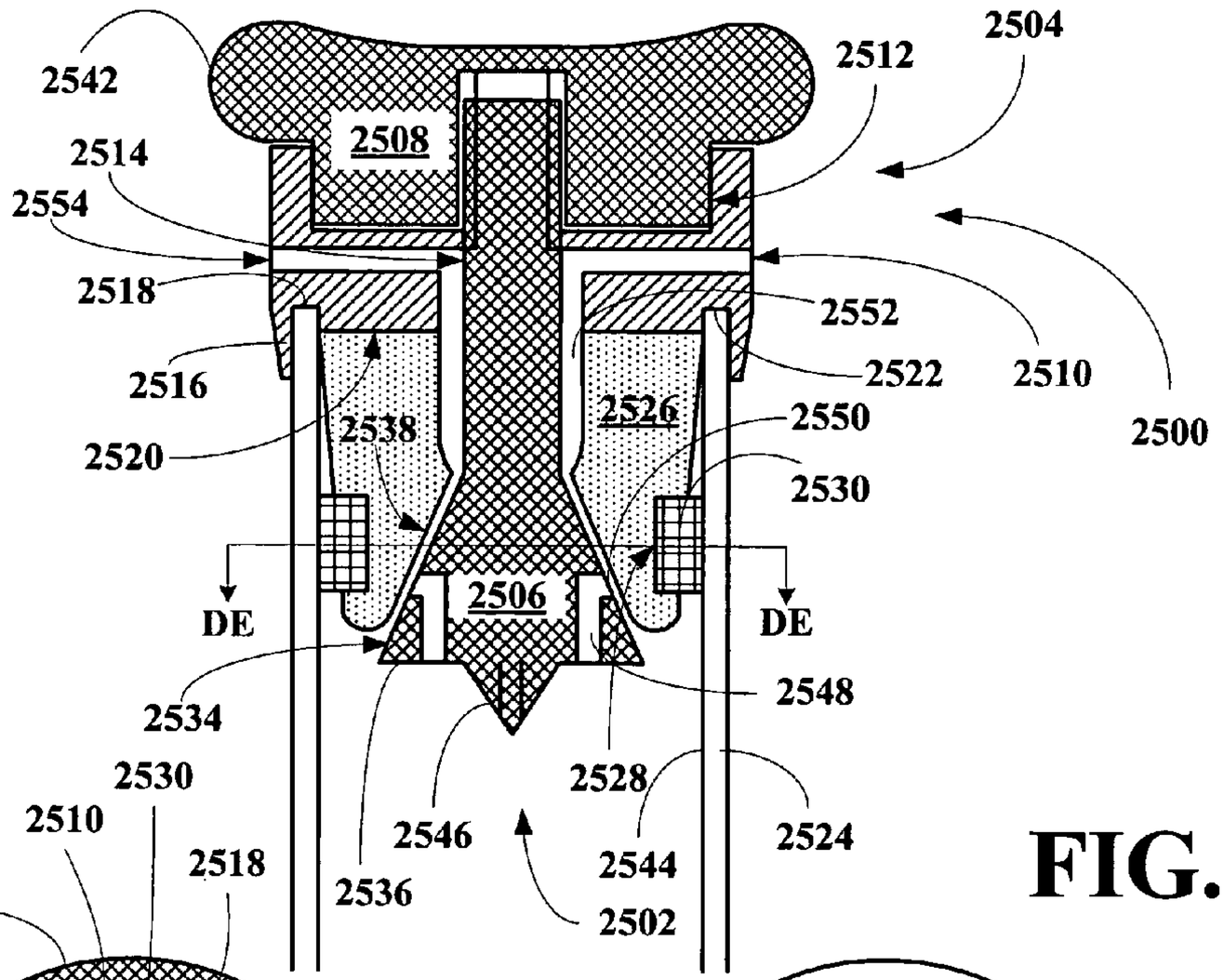


FIG. 25a

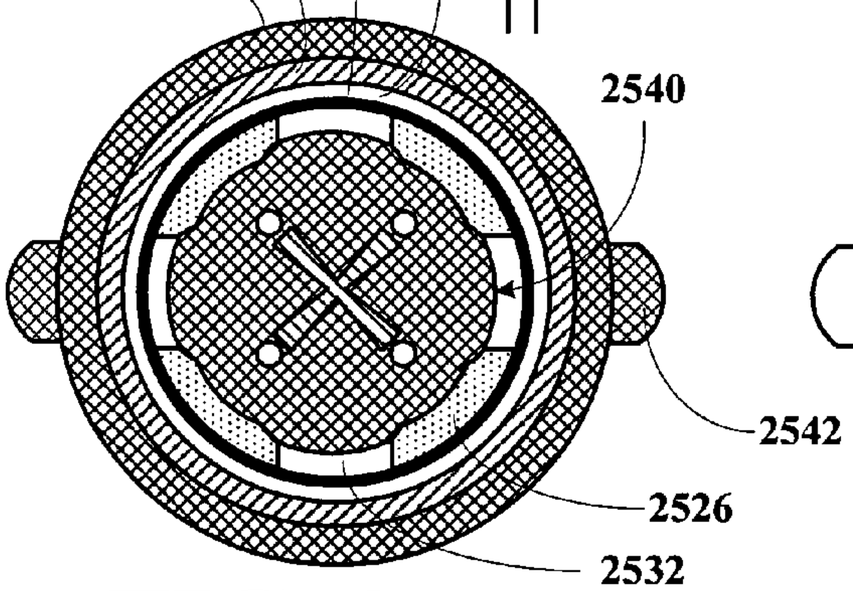


FIG. 25B

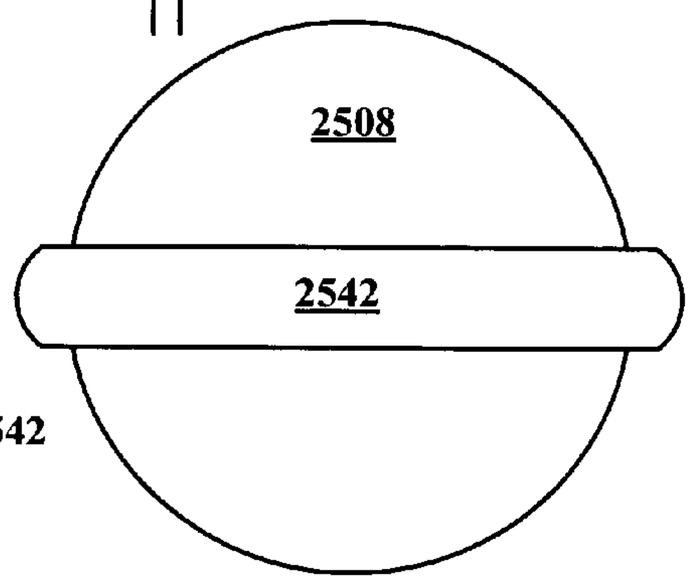


FIG. 25C

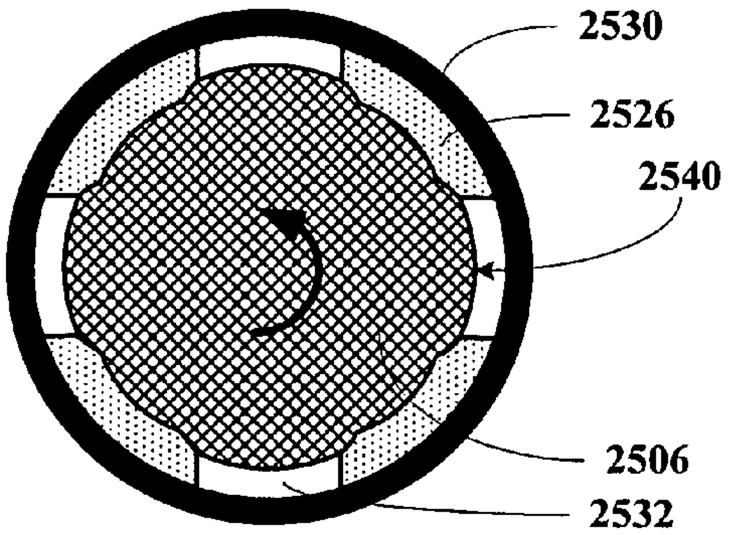


FIG. 25D

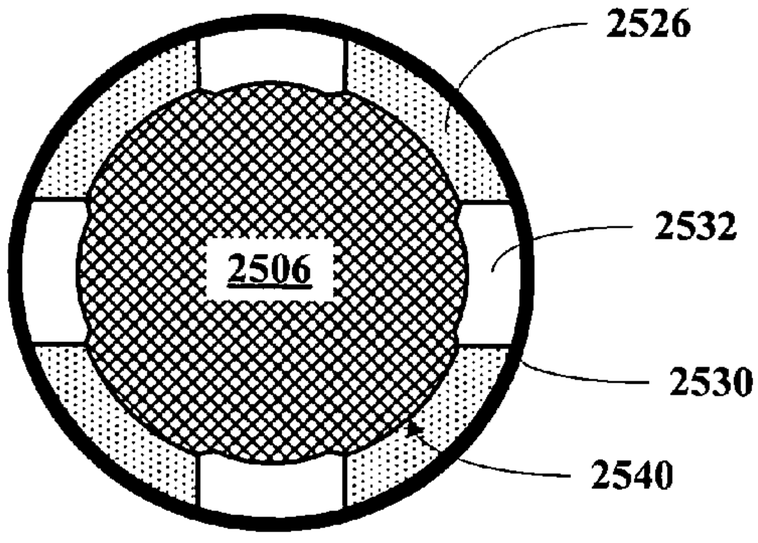


FIG. 25E

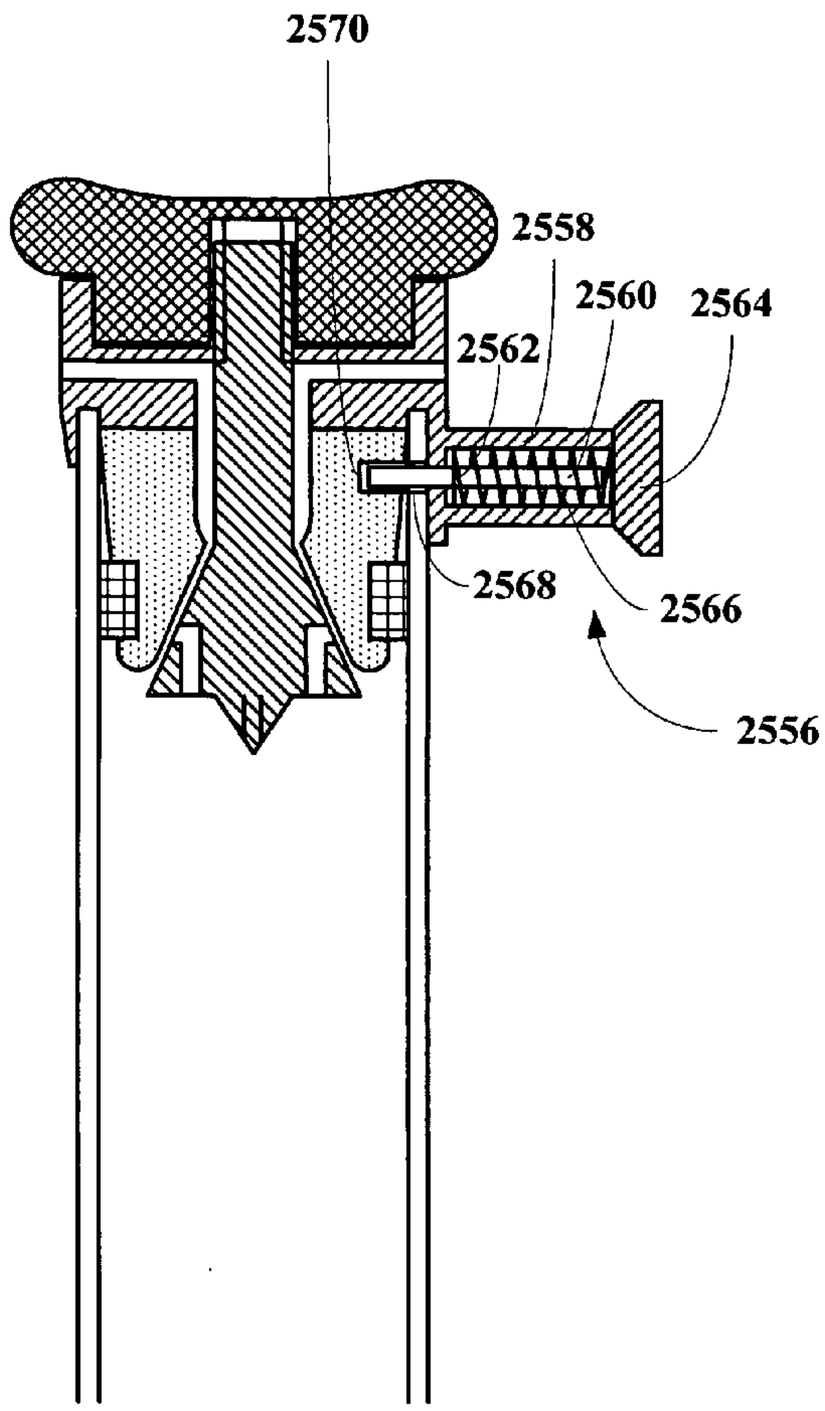


FIG. 25F

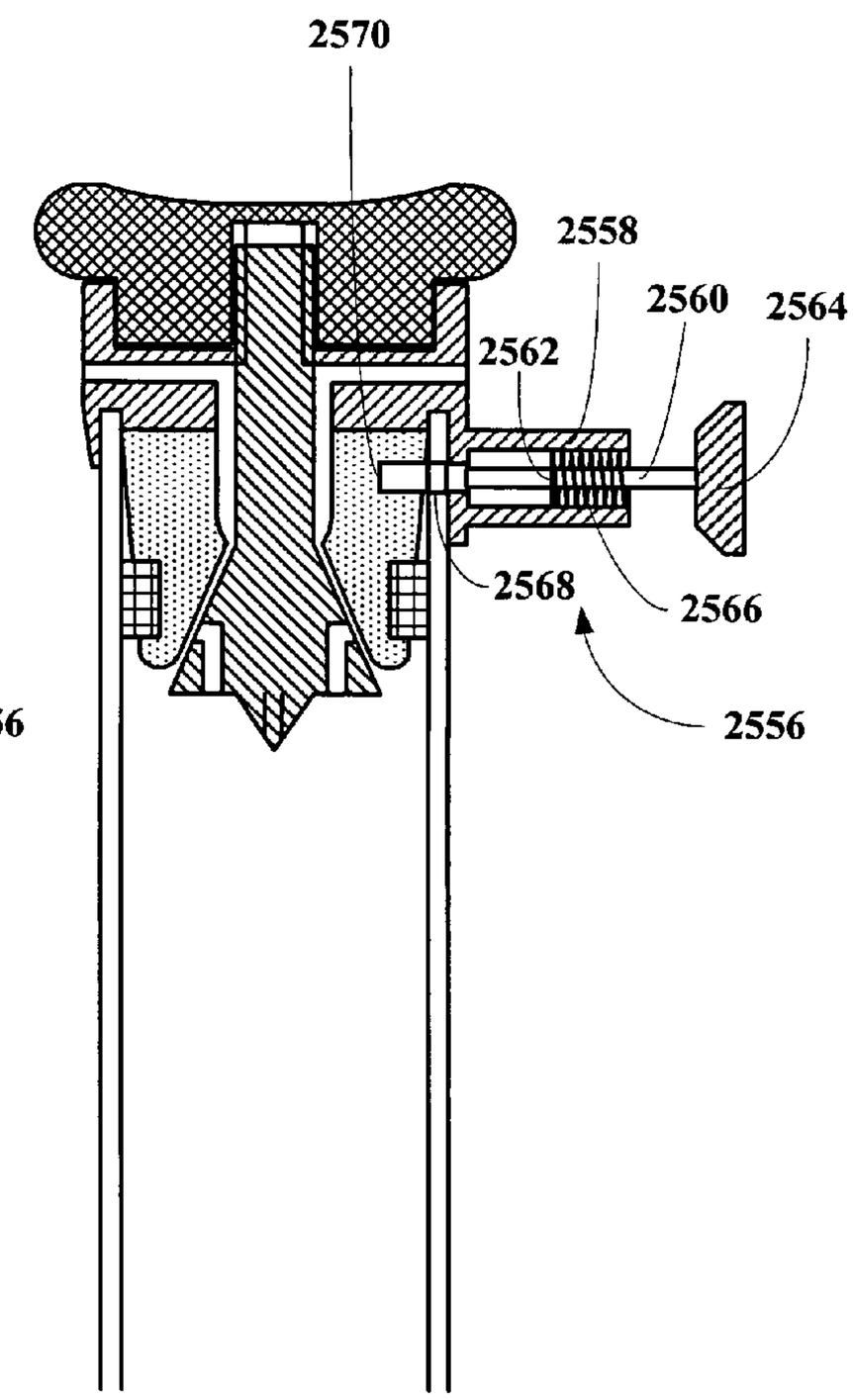


FIG. 25G

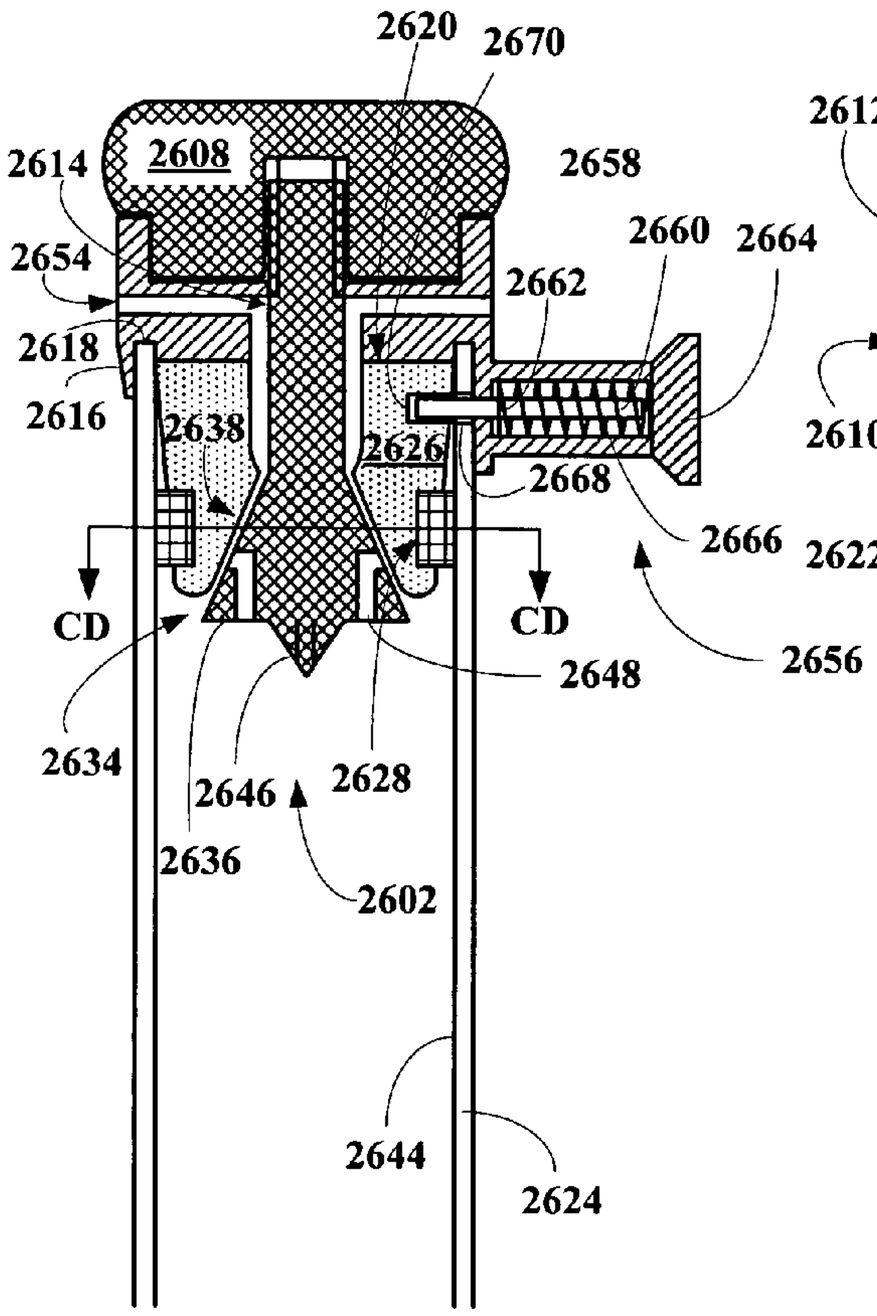


FIG. 26A

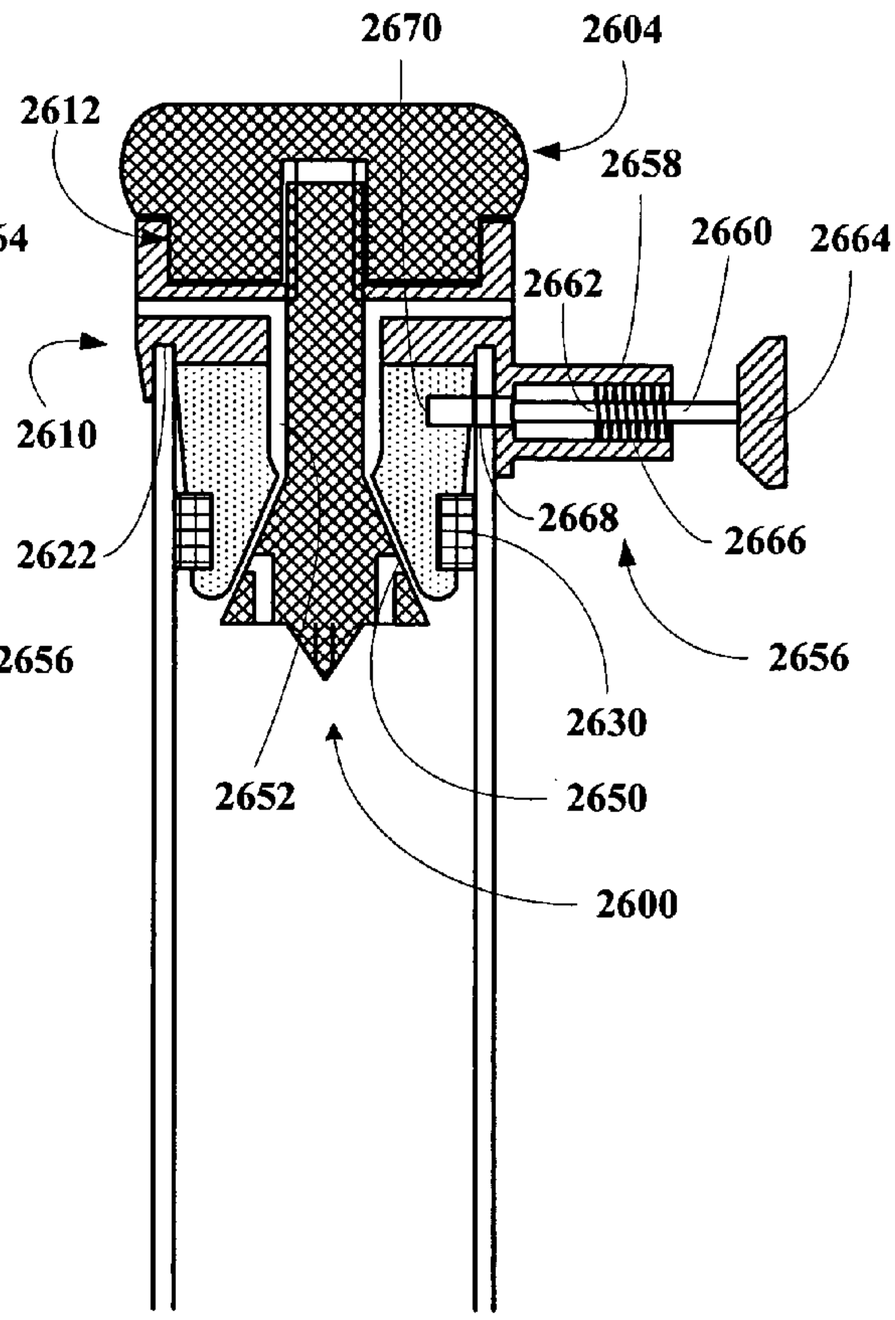


FIG. 26B

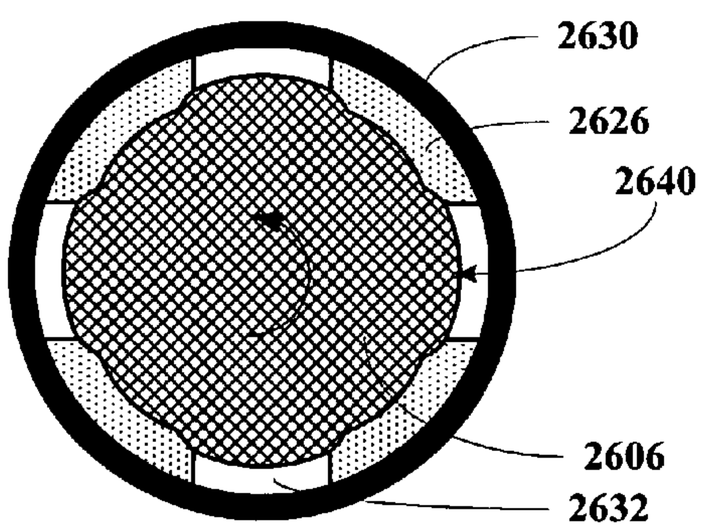


FIG. 26C

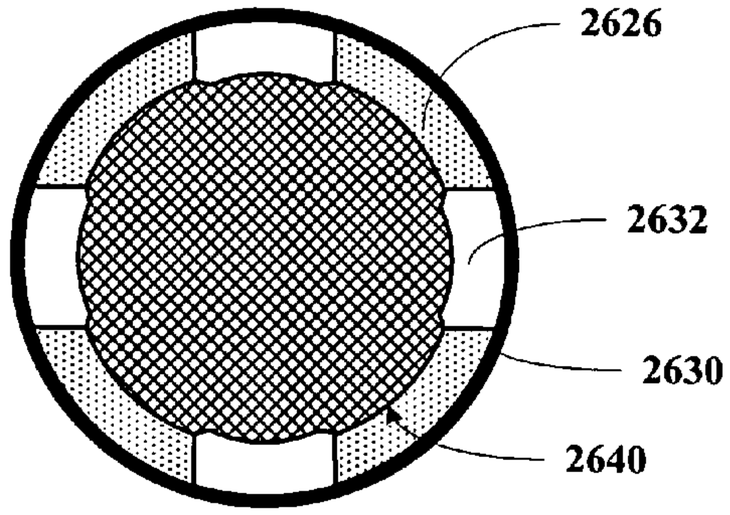


FIG. 26D

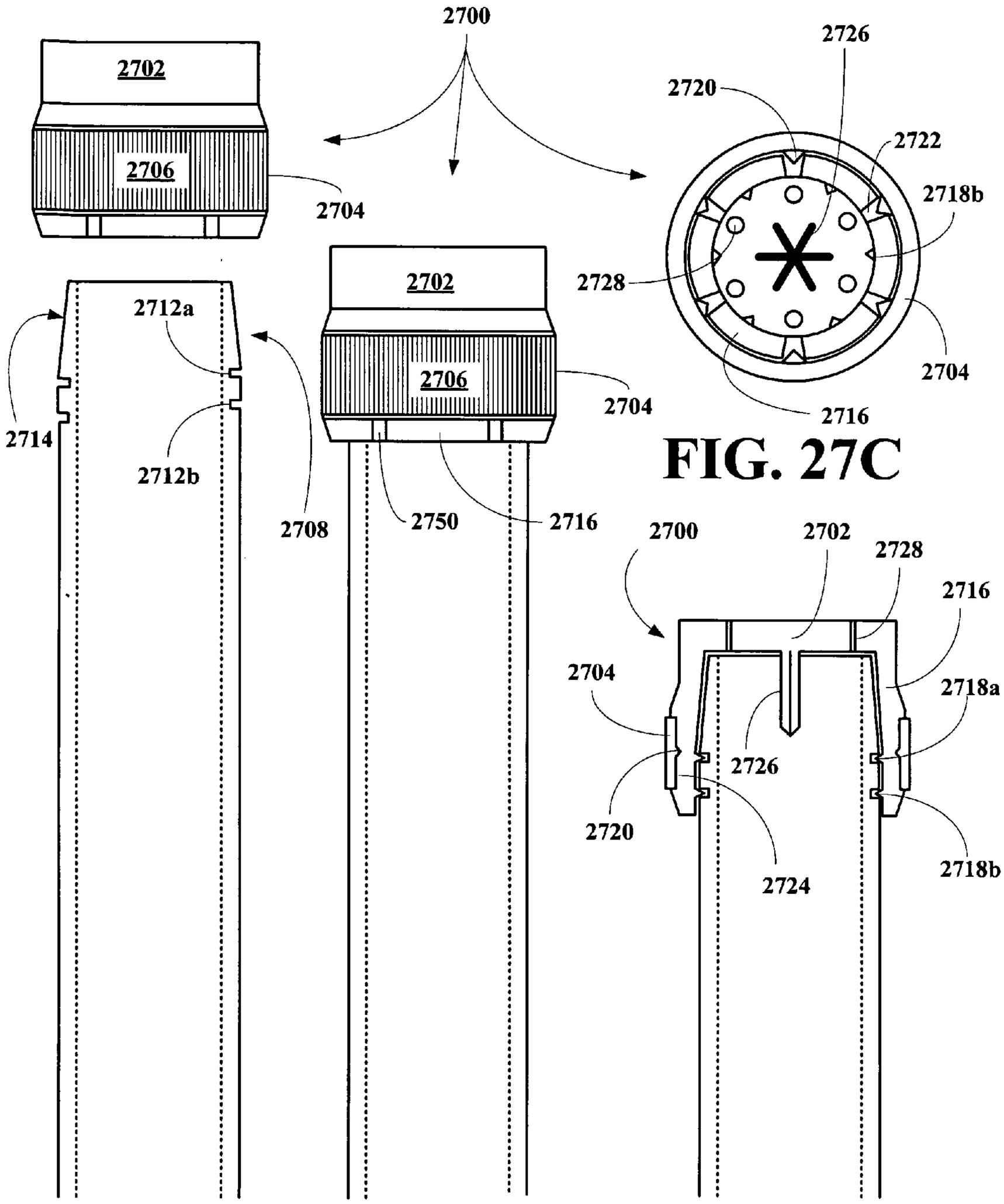


FIG. 27C

FIG. 27A FIG. 27B FIG. 27D

BARREL LOCKING APPARATUS FOR A PAINTBALL GUN

RELATED APPLICATIONS

This application is a continuation-in-part of U.S. patent application Ser. No. 11/483,257, filed Jul. 7, 2006, which is a continuation-in-part of U.S. patent application Ser. No. 11/402,211, filed Apr. 11, 2006, which is a continuation-in-part U.S. patent application Ser. No. 11/157,131, filed Jun. 20, 2005, which is a continuation-in-part of U.S. patent application Ser. No. 11/069,768, filed Mar. 1, 2005, now U.S. Pat. No. 7,210,389 which is a continuation-in-part of U.S. patent application Ser. No. 10/862,005, filed Jun. 4, 2004, now U.S. Pat. No. 7,021,303, issued Apr. 6, 2006, incorporated therein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a paintball or other non-lethal gun or marker barrel locking end cap apparatus.

More particularly, the present invention relates to a paintball or other non-lethal gun or marker barrel locking end cap apparatus, where the apparatus includes a hollow external barrel end engaging member and a cap having a paintball penetrator disposed within an interior of the cap and/or a vent for venting gas and/or paint. The present invention also includes a barrel blocking apparatus including a portion that is inserted into an end of the barrel including a paintball rupturing member or spike and optionally vents and via rotation of the top portion a set of pads in the inserted portion is pushed against the interior of the barrel to hold the apparatus in place. The apparatus is designed so that when an inadvertently discharged paintball impinges on the spike, the force increases the locking force against the barrel.

2. Description of the Related Art

Inadvertent firing or discharging of a paintball from a paintball gun or marker is a serious safety problem facing users, spectators and innocent bystanders. Although many barrel adaptors or condoms have been designed and introduced into the market, these devices are capable of being easily detached removing any protection that the devices afforded prior to detachment.

Thus, there is a need in the art for an improved barrel plug or condom for use with paintball or other non-lethal guns or markers to improve safety and lessen the chance of inadvertent detachment of the device.

SUMMARY OF THE INVENTION

The present invention provides a paintball gun or marker barrel locking end cap including an internal barrel portion comprising a cylindrical barrel plug insert having an inwardly extending paintball penetrating member disposed therein and one or a plurality of vents leading from an interior of the barrel to an exterior of the end cap. The vents are designed to exhaust any gases from an inadvertent firing or discharging of the gun or marker and to exhaust any paint from a paintball after the paintball has been punctured by the penetrating member. The end cap also includes an external portion comprising an outer barrel surface engaging assembly designed to surround an outer portion of the barrel near an end of the barrel, where the engaging assembly includes an outer barrel engaging and securing or locking member with a locking force that is sufficient to make removal with out loosening difficult. The outer barrel member of the engaging assembly is designed to engage the outer portion of the barrel with sufficient force that the end cap cannot be removed without reducing an engaging force by untightening the outer barrel member.

The present invention provides a paintball gun or marker barrel locking end cap including an outer barrel engaging and locking assemblage having a paintball penetrator disposed on an interior, distal surface of the assemblage and optionally a plurality of vents disposed at or near the distal end of the assemblage. The assemblage also includes a plurality of barrel engaging members or fingers and a threaded tightener sleeve adapted to tighten or loosen a locking force between the members and an outer surface of the barrel and optionally a stop adapted to stop the tightener at a certain position when fully untightened. Alternatively, the opened end of the assemblage can be slotted so that when the tightening sleeve is tightened in forces an inner surface of the opened end into frictional contact with an end of a barrel of a paintball gun. The tube or its members are designed to engage an outer surface of a paintball barrel with a locking force that is sufficient to make removal without loosening difficult to very difficult, where difficult means that a child or young adult would not have sufficient strength to remove the end cap and very difficult means that a normal adult would also be unable to remove the end cap.

The present invention provides a method for preventing inadvertent paintball discharges from a paintball gun or mark including the step of inserting an internal barrel portion of a locking barrel end cap into an end of a barrel of a paintball gun or marker, where the internal barrel portion comprises a cylindrical barrel plug insert having an inwardly extending paintball penetrating member disposed therein and one or a plurality of vents leading from an interior of the barrel to an exterior of the end cap. The vents are designed to exhaust any gases from an inadvertent firing or discharging of the gun or marker and to exhaust any paint from a paintball after the paintball has been punctured by the penetrating member. After inserting the internal portion into the barrel end, an external portion is tightened about a portion of the barrel near the barrel end with sufficient engaging force that the end cap cannot be removed unless the external portion is loosened or untightened, where the external portion comprises an outer barrel surface engaging member designed to surround an outer portion of the barrel near an end of the barrel. The external portion of the barrel end cap apparatus can be integral with, affixed to or detachably affixed to the internal portion of the barrel end cap.

The present invention also relates to a barrel engaging and locking apparatus for use with non-lethal propellant drive guns, which propel soft balls from a barrel, where the apparatus includes a member having a closed end and a threaded opened end. The apparatus also preferably includes one or a plurality of vents associated with or located near its closed end.

The present invention also relates to a barrel engaging and locking apparatus for use with non-lethal propellant drive guns, which propel soft balls from a barrel, where the apparatus includes two apertures in the barrel along its length, but preferably near its end and a blocking pin designed to be inserted into the apertures, where the pin stop any projectiles fired from the gun. Preferably, the pin has a tab on its proximal end making it easier to grab. The pin also preferably includes a locking member designed to prevent the pin from being dislodged from the apertures in the barrel. The apparatus can also include a mount mounted on the barrel for holding or securing the pin when it is not inserted through the apertures in the barrel. The apparatus can also include a retaining member attached at one end it to the proximal end of the pin and

attached at its other end to the mount where the retaining member is designed to reduce the tendency of the pin to be lost.

The present invention also relates to a barrel engaging and locking apparatus for use with non-lethal propellant drive guns, which propel soft balls from a barrel, where the apparatus includes a slot in the barrel fitted with a pivoting flip tab that when flipped up blocks the barrel and when flipped down closes the slot. The apparatus also preferably includes a releasable locking member for holding the tab in its up position until the locking member is released.

The present invention also relates to a barrel engaging and locking apparatus for use with non-lethal propellant drive guns, which propel soft balls from a barrel, where the apparatus includes a slot in the barrel, an insertion disk, an insertion tab mount, and a retaining member attached to the insertion disk and the mount, where the disk is designed to be inserted in to the slot to block the barrel at the slot. The apparatus also preferably includes a releasable locking member associated with either the barrel or the disk to locks the tab in place until released.

The present invention also relates to a barrel engaging and locking apparatus for use with non-lethal propellant drive guns, which propel soft balls from a barrel, where the apparatus includes a diaphragm blocking device having a diaphragm and a turnable housing mounted into the barrel. The turnable housing is designed to open and close the diaphragm. The diaphragm is designed to open such that the diaphragm retracts into the housing clearing the barrel.

The present invention relates to barrels having a first connector at its proximal end adapted to detachably or permanently attached to a paintball gun and a second connector at its distal end adapted to detachably engage a connector of a barrel blocking apparatus so that inadvertently fired paintballs are destroyed within the blocking device causing no harm to people or animals.

The present invention also relates to barrel blocking assemblies including barrel blocking apparatus including a closed end having a spike extending outward from an inner surface of the closed end and adapted to rupture paintball impinging thereon. The barrel blocking apparatus also include a plurality of vents adapted to allow gases and liquid to escape from an interior of the apparatus. The apparatus also includes an open end and a connector at or near its open end adapted to detachably engage a corresponding connector at or near a distal end of a barrel of a paintball gun. The connector on the barrel blocking apparatus can be male or female, threaded or non-threaded provided of course that the paintball barrel have a corresponding connector. The barrel blocking apparatus can also includes one or a plurality of lights powered by a battery, where the lights can be used to indicate many different situation, such as a paintball player that is now out of a game, a gun that is properly affixed with a barrel blocking device, gun status, etc. The assembly can also include a mounting apparatus including two open ends and a connector adapted to detachably engage a corresponding connector at or near the distal end of the barrel. The mounting apparatus is fixedly or detachably attached to the barrel blocking apparatus. The mounting apparatus includes mounts for detachably attaching scope, lights, laser pointer, distant monitors or other paintball accessories to the mounting apparatus so that the accessories are located at the distal end of the barrel and are designed to improve gun aiming, improve target illumination, improve distance determination, etc.

New Disclosure

The present invention also relates to barrel blocking apparatus including a hollow barrel engaging member designed to be fitted onto an end of paintball gun. The barrel engaging member includes a locking assembly designed to detachably lock or attach the barrel engaging member to the barrel with sufficient force that the member cannot be removed without untightening the locking assembly attaching the member to the barrel, e.g., threads at an end of the barrel, threaded ring designed to force pads into direct contact with the barrel, or any other means for fastening the hollow member to the end of the barrel. The apparatus also includes a paintball blocking member adapted to be detachable connected to the hollow engaging member so that the paintball blocking member prevents paintballs from existing the blocking member if the gun is inadvertently discharged. The blocking member can include a penetrator disposed in inner end of the blocking member and adapted to rupture a paintball as it exists the barrel and the blocking member. The member can also include vents adapted to vent gas propelling the paintball as well as the paint from the paintball. In certain embodiments, the blocking member includes both a penetrator and at least one vent. In other embodiments, the inner end of the blocking member includes sharp raised bumps adapted to rupture the paintball on impact. In other embodiments, the blocking member includes only at least one vent. In other embodiments, the apparatus includes at least one light designed to signify that the barrel is blocked, the barrel is blocked and the player is no longer an active player in a game or exercise. In other embodiments, the lights are part of a separate end member that is detachably connected to a distal end of the blocking member. Thus, the apparatus can include two members or three member. The barrel engaging member is adapted to be attached to the end of the barrel and left there. The present also related to barrel made with the engaging member a permanent part of the barrel.

Most Recent Disclosure

DESCRIPTION OF THE DRAWINGS

The invention can be better understood with reference to the following detailed description together with the appended illustrative drawings in which like elements are numbered the same:

Figures for the Embodiment of the Parent

FIGS. **1**A-D depict an embodiment of a locking barrel end cap for a paintball gun in cross-sectional, plan and top views, respectively;

FIGS. **2**A-D depict another embodiment of a locking barrel end cap for a paintball gun in cross-sectional, side and top views, respectively and an expanded view of an engaging ring;

FIGS. **3**A-C depict another embodiment of a locking barrel end cap for a paintball gun in a cross-sectional, side and perspective views;

FIG. **4** depicts a side view of another embodiment of a locking barrel end cap for a paintball gun;

Figure for the Embodiment of the First CIP

FIG. **5**A depicts a cross-sectional view of a preferred embodiment of a outer barrel engaging and locking assemblage;

FIG. **5**B depicts an end view of the assemblage of FIG. **5**A;

FIG. **5**C depicts a side view of an barrel engaging member of this invention,

FIG. **5**D depicts a front view of the barrel engaging member of FIG. **5**C mounted in its corresponding aperture;

FIG. **5**E depicts a cross-section view of another embodiment of a outer barrel engaging and locking assemblage;

FIG. **5**F depicts an end view of the tube of FIG. **5**E;

FIG. **5**G depicts a cross-section view of another embodiment of a outer barrel engaging and locking assemblage;

FIG. **5**H depicts an end view of the tube of FIG. **5**G;

Figures for the Embodiment of the Second CIP

FIGS. **6**A&B depict embodiments of a barrel blocking assembly including a barrel having a distal including a threaded connector and a barrel blocking apparatus including a threaded connector designed to engage the threaded connector of the barrel;

Figures for the Embodiment of the Third CIP

FIGS. **7**A&B depict other embodiments of a barrel blocking assembly including a barrel having a distal including a threaded connector and a barrel blocking apparatus including a threaded connector designed to engage the threaded connector of the barrel;

FIG. **8** depicts an embodiment of a barrel blocking assembly including a barrel having first and second apertures disposed on opposite side of the barrel and a pin connected to the barrel by a tether and adapted to be inserted through the apertures;

FIGS. **9**A&B depict embodiments of a barrel blocking assembly including a barrel having a distal including a threaded connector and a barrel blocking apparatus including a threaded connector designed to engage the threaded connector of the barrel;

FIGS. **10**A&B depict embodiments of a barrel blocking assembly including a barrel having a distal including a threaded connector and a barrel blocking apparatus including a threaded connector designed to engage the threaded connector of the barrel;

FIGS. **11**A&B depict embodiments of a barrel blocking assembly including a barrel having a distal including a threaded connector and a barrel blocking apparatus including a threaded connector designed to engage the threaded connector of the barrel;

Figures for the Embodiment of the Fourth CIP

FIGS. **12**A-C depict an embodiment of a barrel blocking assembly including a barrel including a male threaded connector and a barrel blocking apparatus including a female threaded connector;

FIGS. **13**A-C depict embodiments of a barrel blocking assembly including a barrel having an enlarged distal end and a connector comprising a plurality of indentations and a barrel blocking apparatus including a plurality of spring loaded members for detachably engaging the barrel connector;

FIGS. **14**A-E depict embodiments of a barrel blocking assembly including a barrel having a threaded connector ring adapted to be fitted onto a distal end of the barrel so that the barrel is equipped with a threaded connector and a barrel blocking apparatus including a threaded connector designed to engage the threaded connector of the barrel;

FIGS. **15**A-D depict embodiments of a barrel blocking assembly including a barrel having a flared end and a female connector comprising an interior groove and a barrel blocking apparatus including a connector comprising a plurality of spring loaded member adapted to engage the groove of the barrel connector;

FIGS. **16**A-C depict embodiments of a barrel blocking assembly including a barrel having a flared distal end and a female threaded section disposed on an interior of the flare and a barrel blocking apparatus including an external, male threaded section adapted to engage the barrel connector;

FIGS. **17**A-C depict an embodiment of a barrel blocking assembly including a barrel including a male threaded connector and a multi-purpose barrel blocking apparatus including a barrel blocking apparatus including a female threaded connector and a mount assembly including a female threaded connector,

FIGS. **18**A-C depict an embodiment of a barrel blocking assembly including a barrel including a male threaded connector and a multi-purpose barrel blocking apparatus including a barrel blocking apparatus including a female threaded connector and a mount assembly including a non-threaded, female connector,

FIGS. **19**A-H depict several mounts for paintball accessories that can be mounted on the assembly of FIGS. **17** and **18**;

Figures for Embodiments of the Fifth CIP

FIGS. **20**A&B depict another embodiment of a barrel blocking apparatus including a barrel engaging member and a blocking member;

FIGS. **21**A&B depict another embodiment of a barrel blocking apparatus including a barrel engaging member, a blocking member, and an end member;

FIGS. **22**A, **22**B and **22**C depicts another embodiment of a barrel blocking apparatus including a barrel engaging member, a blocking member, and an end member;

FIGS. **23**A and **23**B depicts another embodiment of a barrel blocking apparatus including a barrel having a blocking member connector disposed at its distal end, a blocking member, and an end member; and

FIGS. **24**A, **24**B and **24**C depicts another embodiment of a barrel blocking apparatus including a barrel having a barrel blocking engaging member and a barrel plug.

Figures for Embodiments of the This CIP

FIGS. **25**A-G depict another embodiment of a barrel blocking apparatus of this invention including an insertion portion and a surrounding portion, with or without a secondary locking assembly;

FIGS. **26**A-D depict another embodiment of a barrel blocking apparatus of this invention including an insertion portion and a surrounding portion, with a secondary locking assembly; and

FIGS. **27**A-D depict another embodiment of a barrel blocking apparatus for use with a grooved barrel end.

DETAILED DESCRIPTION OF THE INVENTION

The inventors have found that a barrel end cap can be constructed that includes an internal portion having a paintball an inwardly extending penetration member and a plurality of aperture leading from the barrel interior to the exterior of the end cap. The end cap also includes an external part having a securing or locking assembly that is designed to engage an exterior surface of the barrel with sufficient force to prevent the cap from being inadvertently detaching from the barrel.

The present invention broadly relates to a paintball gun or marker locking end cap apparatus including an internal portion having a barrel insert including a paintball penetrating device extending from an interior of the insert towards a barrel end of the insert and one or a plurality of vents allowing materials to flow from an interior of the barrel to the surroundings. The penetrating device is designed to rupture any paintball inadvertently fired or discharged by the paintball gun or marker and the vent or vents are designed to exhaust any gases or paint from an inadvertent firing or discharging of the paint-

ball gun or marker. The end cap apparatus also includes an external portion including a barrel engaging assembly, where the barrel engaging assembly is designed to engage an outer portion of the barrel near the barrel end with sufficient force so that the end cap cannot be removed without first untightening or unlocking the barrel engaging assembly.

Embodiments of This CIP

One new embodiments broadly relate to an internal barrel blocking apparatus that includes an oil ring or other similar frictional engaging ring for engaging an inner wall of a barrel of a non-legal gun or marker such as a paintball gun. The frictional engaging ring is disposed with in grooves in four prongs of a insertion portion of the barrel blocking apparatus, i.e., the portion of the apparatus that is inserted into the barrel. The four prongs are spaced apart with gaps therebetween and are supported by a non-rotatable outer portion of the apparatus. The barrel blocking apparatus also includes a central post that is flared at its distal end and mounted on a rotatable outer portion of the apparatus. The post may include a spike disposed in a center of the flared portion for assisting in the rupturing of inadvertently fired paintballs. Like all the barrel blocking apparatuses of this invention, these embodiments are designed to prevent a paintball leaving the barrel until the blocking apparatus has been removed. Additionally, the apparatus is designed to be able to withstand at least ten and up to hundreds of inadvertently discharged paintballs. The apparatus may also include vents designed to vent paint and gases that accompany an inadvertently fired paintball. The central post include four raised sections. These raised sections are designed to be positioned in the gaps between the prongs so that in the prongs are in a retracted state when the insertion portion of the apparatus is inserted into an end of the barrel. Once the insertion portion has been inserted into the end of the barrel, the rotatable outer portion of the apparatus is rotated about a quarter turn, which forces the raised section of the central post to contract inner surfaces of the prongs forcing the prongs outward, which in turn compresses the friction ring against the inner surface of the barrel locking the apparatus in place. Because the center post is flared at its distal end and have raised section that lock the frictional ring against the inner surface of the barrel, when a paintball is inadvertently discharged, the force of the paintball striking the central post actually increases the locking force of the friction ring against the barrel. For barrels having apertures therein at its discharge end, the apparatus may also include a spring loaded pin that when the insertion portion of the apparatus has been inserted into the barrel, then the user can rotate the entire apparatus until the spring loaded pin inserts into one of the barrel aperture providing a second level of locking of the apparatus to the barrel. The spring load pin includes a retractable cap that permits withdrawal of the pin from the barrel aperture so that the apparatus can be removed before or after the rotatable portion has been rotated to unlock the pressure on the friction ring.

Another new barrel blocking embodiment is designed to work with a barrel having a series of groove near is discharge end. The barrel may also be tapered after the last groove. The blocking apparatus includes a top potion having a plurality of downwardly extending spaced apart prongs having raised portions disposed on their inner surface adapted to insert into the groove in the barrel end. The top may also include a spike disposed in a center of the top portion on its inner surface to assist in rupturing inadvertently fired paintballs. The top may also include vents designed to vent paint and gases that accompany an inadvertently fired paintball. The apparatus also includes a rotatable outer ring having a plurality of protrusions disposed along its inner surface so that the protrusion fit in between the prongs when the apparatus is in its unlocked state. By rotating the outer ring relate to the top portion of the apparatus, the protrusions engage outer surfaces of the prongs forcing the raised portions of the prongs to insert into the groove in the barrel locking the apparatus in place.

Referring now to FIGS. **1**A-D, an embodiment of a paintball gun end cap apparatus, generally **100**, is shown to include an internal portion **110** and an external portion **150**. The internal portion **110** includes a cylindrical barrel plug insert **112** having a paintball penetrating member **114** comprising an inwardly pointing spike **116** having a pointed tip **118** and a plurality of vents **120**. The penetrating member **114** is designed to rupture any paintball inadvertently fired or discharged from a paint ball gun (not shown) as it travels down a barrel **122** toward the penetrating member **114**. The vents **120** are designed to exhaust any gases or fluid generated from an inadvertent firing or discharging of a paintball and rupturing of the paintball as it encounters the penetrating member **114**.

The external portion **150** includes cap portion **152** and a cylindrical outer barrel engaging portion **154** including two opposing slits **156** and a tightening assembly **158** associated with each slit **156**. The assembly **158** is designed to generate a sufficient engaging force against a portion **160** of the barrel **122** so that the apparatus cannot be removed without untightening the assembly **158**. The tightening assembly **158** includes a base **162**, a guide block **164**, a threaded block **166** and a threaded wing nut **168**, where the wing nut **168** (or any other threaded bolt that can be tightened using a user's finger) is inserted through an aperture **170** in the guide block **162** and into a threaded aperture **172** in the threaded block **166** so that by screwing the wing nut **168** into the threaded aperture **172**, the slit **156** is narrowed or closed generating the engaging force. Additionally, the barrel **122** can include a groove (not shown) into which a tab (not shown) on the inside of the outer barrel engaging portion **154** fits to further secure the apparatus **100** to the barrel **122**. The apparatus **100** also includes straps **174** and strap blocks **176** affixed to the cap portion **152**, where the straps **174** are designed to prevent the end cap apparatus **100** from being lost from the gun when not in use. The straps **174** generally are tied to the gun at their other ends.

Looking at FIG. **1**C, the apparatus **100** includes two opposing slits **156** having associated tightening assemblies **158**, one for each slit **156**. Looking at FIG. **1**D, the apparatus **100** includes a single slit **156** having an associated tightening assembly **158**.

Referring now to FIGS. **2**A-C, another embodiment of a paintball gun end cap apparatus, generally **200**, is shown to include an internal portion **210** and an external portion **250**. The internal portion **210** includes a cylindrical barrel plug insert **212** having a paintball penetrating member **214** comprising an inwardly pointing spike **216** having a pointed tip **218** and a plurality of vents **220**. It should be recognized that although a single penetrating member **214** is shown, a plurality of such members could also be used. The penetrating member **214** is designed to rupture any paintball inadvertently fired or discharged from a paint ball gun (not shown) as it travels down a barrel **222** toward the penetrating member **214**. The vents **220** are designed to exhaust any gases or fluid generated from an inadvertent firing or discharging of a paintball and rupturing of the paintball as it encounters the penetrating member **214**.

The external portion **250** includes cap portion **252** and a slotted cylindrical outer barrel engaging portion **254** including a plurality of slots **256** separating a plurality of barrel engaging members **258** having tightening ring supports **260**.

The engaging portion **254** also includes a tightening ring **262** having a tightening assembly **264** associated therewith supported on the ring supports **260**. The assembly **264** is designed to tighten the tightening ring **262** generating a sufficient engaging force against a portion **266** of the barrel **222** so that the apparatus cannot be removed without untightening the assembly **264**. The tightening assembly **264** includes a guide block **268**, a threaded block **270** and a threaded wing nut **272**, where the wing nut **272** (or any other threaded bolt that can be tightened using a user's finger) is inserted through an aperture **274** in the guide block **268** and into a threaded aperture **276** in the threaded block **270** so that by screwing the wing nut **272** into the threaded aperture **276**, the engaging members **258** are forced towards each other closing the slots **256** generating the engaging force. Additionally, the barrel **222** can include a groove into which a tab on the inside of the outer barrel engaging portion **254** fits to further secure the apparatus **200** to the barrel **222**. The apparatus **200** also includes straps **278** and strap blocks **280** affixed to the cap portion **252**, where the straps **278** are designed to prevent the end cap apparatus **200** from being lost from the gun when not in use. The straps **278** generally are tied to the gun at their other ends. Looking at FIG. **2**D, the tightening ring **262** is shown separated clearly showing that the guide block **268** and the threaded block **270** comprise opposing ends **282** of the tightening ring **262**.

Referring now to FIGS. **3**A-C, another embodiment of a paintball gun end cap apparatus, generally **300**, is shown to is shown to include an internal portion **310** and an external portion **350**. The internal portion **310** includes a larger cylindrical cap portion **311** and a smaller cylindrical barrel insert **312** and a paintball penetrating member **314** comprising an inwardly pointing spike **316** having a pointed tip **318** and a plurality of vents **320**. The penetrating member **314** extends inward from a cross-beam **315**. It should be recognized that although a single penetrating member **314** is shown, a plurality of such members could also be used. The penetrating member **314** is designed to rupture any paintball inadvertently fired or discharged from a paint ball gun (not shown) as it travels down a barrel **322** toward the penetrating member **314**. The vents **320** are designed to exhaust any gases or fluid generated from an inadvertent firing or discharging of a paintball and rupturing of the paintball as it encounters the penetrating member **314**. The cap portion **311** includes two protrusions **324** designed to engage apertures on the external portion **350**.

The external portion **350** includes two C-shaped barrel engaging members **352**, each member **352** including a vertical post **354** having an aperture **356** designed to engage the protrusions **324** so that the members **352** hang from the protrusions **324**. Each C-shaped barrel engaging member **352** includes a first end **358** having a guide block **360** including a guide aperture **362** therethrough extending outwardly therefrom. Each C-shaped barrel engaging member **352** also includes a second end **364** having a threaded block **366** including a threaded aperture **368** therethrough extending outwardly therefrom, where the threaded aperture **368** is designed to engage a wing nut (not shown) or other hand tightenable threaded member.

Referring now to FIG. **4**, another embodiment of a paintball gun end cap apparatus, generally **400**, is shown to include an internal portion **410** and an external portion **450**. The internal portion **410** includes a larger cylindrical cap portion **411** and a smaller cylindrical barrel insert **412** and a paintball penetrating member **414** comprising an inwardly pointing spike **416** having a pointed tip **418** and further comprising a plurality of vents **420**. The penetrating member **414** extends inward from a top **413** of the larger cylindrical cap portion **411**. It should be recognized that although a single penetrating member **414** is shown, a plurality of such members could also be used. The penetrating member **414** is designed to rupture any paintball inadvertently fired or discharged from a paint ball gun (not shown) as it travels down a barrel (not shown) toward the penetrating member **414**. The vents **420** are designed to exhaust any gases or fluid generated from an inadvertent firing or discharging of a paintball and rupturing of the paintball as it encounters the penetrating member **414**. The cap portion **411** includes two protrusions **424** designed to engage apertures on the external portion **450**.

The external portion **450** includes two C-shaped barrel engaging members **452**, each member **452** including a vertical post **454** having an aperture **456** designed to engage the protrusions **424** so that the members **452** hang from the protrusions **424**. Each C-shaped barrel engaging member **452** includes a first end **458** having a guide block **460** including a guide aperture **462** therethrough extending outwardly therefrom. Each C-shaped barrel engaging member **452** also includes a second end **464** having a threaded block **466** including a threaded aperture **468** therethrough extending outwardly therefrom, where the threaded aperture **468** is designed to engage a wing nut **470** or other hand tightenable threaded member.

Although several locking assemblies have been shown for securing the end cap apparatuses of this invention to an end of a paintball barrel, other locking assemblies can also be used and are considered equivalents of the threaded connectors shown above. For example, the locking assembly could comprise a clamping device with a release such as a vice-grip, the C-shaped members could have clips or pins, or the ring could be a slotted band with a tightening screw. These and other tightening assemblies can be used equivalently in the barrel end caps of this invention.

Referring now to FIGS. **5**A-C, an embodiment of a closed ended tubular barrel engaging and locking assembly of this invention, generally **500**, is shown to include a tube **502** having an opened end **504** and a closed end **506**. The assembly **500** also includes a sleeve type tightener **508** having a top **510**, a bottom **512** and a inner threaded region **514**. The tube or tubular member **502** also includes a plurality of vents **516** disposed at or near the closed end **506**, where near means within about 0.75" of the closed end **506** and preferably as close to the closed end **506** as practicable. The tube **502** also includes a plurality of barrel engaging members **518** pivotally mounted within a equal plurality of apertures **520** disposed near the opened end **504** of the tube **502**. The tube **502** also includes an outer threaded region **522**. The threaded region **514** is designed to engage the threaded region **522**, when the tightener **508** is turned the tightener **508** either to tighten or loosen the tightener **508**.

Looking at FIGS. **5**C&D, the engaging members **518** are in the shape of a triangular solid and include rubber pads **524** disposed on their inner surfaces **526** for frictionally engaging a barrel **528** of a paintball gun (not shown) as shown in FIG. **5**B. Each member **518** includes a groove **530** and two raised trapezoid shaped portion **532** disposed one each side **534** of the member **518**. Each aperture **520** includes a tongue **536** adapted to engage the groove **530** so that the member **518** can pivot on the tongue **536**. Each aperture **520** also includes a trapezoid shaped groove **538** adapted to engage the portion **532** so that the member **518** can pivot in a guided manner relative to the tongue **536**.

The tube **502** also includes a paintball penetrator **540** having a tip **542**, where the penetrator **540** is disposed on an inner surface **544** of the closed end **506** and is designed to rupture

any paintball impinging on the tip **542**. The tube **502** can also include penetrator reinforcing members **546**. The tube **502** can also include a penetrator protector **548** disposed on the penetrator **532** near its tip **542**. The tube **502** can also includes a plurality of radially disposed grooves **550**. The sleeve tighter **508** can also included a longitudinally extending ribbed pattern **552** for easy of turning.

Looking at FIGS. **5**E&F, the assembly **500** is shown to also includes a penetrator protector **554** including a raised top portion **556** and an aperture therethrough **558** adapted to mount the protector **554** on the pentrator **540**. The protector **554** is shown here to be in the shape of a twelve sided polygon having convex surfaces **560** and concave surfaces **562** and is preferably made out of metal such as aluminum and is designed to take a majority of force of a paintball impinging on the penetrator. Looking at FIGS. **5**E&F, the assembly **500** is shown to also includes a penetrator protector **564**. The protector **564** is also shown here to be in the shape of a twelve sided polygon with convex surfaces **566** and concave surfaces **568** and is preferably made out rubber. Although the protectors **554** and **564** are shown to be twelve sided polygons having convex and concave surfaces, the protectors can be of any shape such as circular, oval, triangular, rectangular, pentagon, hexagonal, etc. and can include convex and/or concave surfaces.

Detailed Description of New Figures

Referring now to FIG. **6**A, an embodiment of a screw-on, hollow, end barrel locking assembly of this invention, generally **600**, is shown to include a hollow tube **602** having an open, threaded end **604** and a closed end **606** optionally including one or a plurality of vents **608**. The assembly **600** is designed to be screwed into a threaded end **610** of a barrel **612** of a non-lethal propellant drive guns **614**. Referring now to FIG. **6**B, another embodiment of a screw-on end barrel locking assembly of this invention, generally **600**, is shown to include a tube **602** having an end **604** and a threaded closed end **606** optionally including one or a plurality of vents **608**. The assembly **600** is designed to be screwed into a threaded end **610** of a barrel **612** of a non-lethal propellant drive guns **614**.

Referring now to FIG. **7**A, an embodiment of a screw-on barrel end cap of this invention, generally **700**, is shown to include a cap **702** having a threaded end **704**, a vent **706** and a grip **708** for allowing a user to tight and un-tighten the cap **700**. Referring now to FIG. **7**B, another preferred embodiment of a screw-on barrel end cap of this invention, generally **750**, is shown to include a cap **752** having a threaded end **754**, a vent **756** and a tapered wing-type grip **758** for allowing a user to tight and un-tighten the cap **700**.

Referring now to FIG. **8**, an embodiment of a pin-type barrel locking assembly of this invention, generally **800**, is shown to include a barrel pin **802** having a head **804**, a body **806** and a distal end **808** having a barrel pin aperture **810** therethrough and a retaining pin **812** designed to be inserted into the locking pin aperture **810**. The assembly **800** also includes a locking pin line **814** attached at one end **816** to the pin head **804** and at its other end **818** to a first line attachment block **820** affixed to a barrel **822**. The assembly **800** also includes a retaining pin line **824** attached at one end **826** to the retaining pin **810** and at its other end **828** to a second line attachment block **830** also affixed to the barrel **824**. The barrel **824** includes a barrel aperture **832** therethrough to receive the barrel locking pin **802**.

Referring now to FIGS. **9**A&B, another embodiment of a pin-type barrel locking assembly of this invention, generally **900**, is shown to include a barrel pin **902** having a head **904**, a body **906**, a distal end **908**, a head end o-ring **910** and a distal end o-ring **912**. The assembly **900** also includes a barrel pin line **914** attached at one end **916** to the pin head **904** and at its other end **918** to a first line attachment block **920** affixed to a barrel **922**. The assembly **900** also includes a locking pin holder **924** affixed to the barrel **922**. The barrel **922** includes a barrel aperture **926** therethrough to receive the barrel locking pin **902** so that the o-rings **910** and **912** seal the barrel aperture **926**.

Referring now to FIGS. **10**A-B, an embodiment of a lever-type barrel locking assembly of this invention, generally **1000**, is shown to include a lever **1002** having a first end **1004**, a body **1006** and a second end **1008**. The lever **1002** is mounted on a lever mount **1010** via a pin **1012**, which allows the lever **1002** to pivot relative to the mount **1010** and block the barrel **1016** when the lever **1002** is in its deployed state. The assembly **1000** also includes a lever retaining block **1014** affixed to the barrel **1016**, which includes a slot **1018** through which the second end **1008** of the lever **1002** travel when in its deployed state to block the barrel **1016** as shown in FIG. **10**B.

Referring now to FIGS. **11**A-B, an embodiment of a lever-type barrel locking assembly of this invention, generally **1100**, is shown to include a lever **1102** having a first end **1104**, and a second end **1106**. The lever **1002** is mounted on a pin **1108**, which allows the lever **1002** to pivot relative to the pin **1108**. The lever **1102** is designed to pivot on the pin **1108** to extend into a barrel **1110** blocking it in its deployed state. The barrel **1110** includes a recess **1112** for allowing the first end **1104** of the lever **1102** to be flush with a surface **1114** of the barrel **1110** when in its non-deployed state and to be lifted to block the barrel **1110**. The barrel **1110** also includes a slot **1116** through which the second end **1106** of the lever **1102** to block the barrel **1110** as shown in FIG. **1**B.

New Embodiments

Referring now to FIGS. **12**A-C, another embodiment of a threaded-type barrel locking assembly of this invention, generally **1200**, is shown to include a barrel **1202** having an external thread section **1204** near its distal end **1206**. The barrel **1202** can also include a threaded section **1208** at its proximal end **1210**, where it would screw into an handle section of a paintball gun (not shown) or the paintball gun can just come equip with an external threaded section near its distal end.

The assembly **1200** also includes a barrel blocking apparatus **1220**. The barrel blocking apparatus **1220** includes a closed end **1222**, a spike **1224** and a plurality of vents **1226**, where the spike **1224** is adapted to rupture an inadvertently fired paintball and the vents **1226** is designed to vent any pressure build up and allow the paint in any ruptured paintball to flow out of the apparatus **1220**. The barrel blocking apparatus **1220** also includes an open end **1228** and an internal threaded section **1230**, where the internal threaded section **1230** of the apparatus **1220** and the external threaded section **1206** are adapted to form a threaded connection **1232**, when the apparatus **1220** is threaded onto the distal end **1206** of the barrel **1202**. The barrel blocking apparatus **1220** also includes a band **1234** having a plurality of lights **1236**. The lights **1236** are powered by a battery **1238** wired to the lights **1236** by wires **1240**.

The present invention also relates to a barrel for a paintball gun including an external threaded section near its distal end. If the barrel is designed to be removed from the paintball gun, then the barrel also included a proximal threaded section so that the barrel can be screwed into the gun.

Referring now to FIGS. **13**A-C, an embodiment of a quick connection-type barrel locking assembly of this invention,

generally **1300**, is shown to include a barrel **1302** having an enlarged section **1304** near its distal end **1306**. The enlarged barrel section **1304** includes two rows **1308***a*&*b* of indentations **1310***a*&*b*. The barrel **1302** can also includes a threaded section at its proximal end (not shown), where it would screw into an handle section of a paintball gun (not shown) or the paintball gun can just come equip with a barrel having an enlarged section near its distal end.

The assembly **1300** also includes a barrel blocking apparatus **1320**. The barrel blocking apparatus **1320** includes a closed end **1322**, a spike **1324** and a plurality of vents **1326**, where the spike **1324** is adapted to rupture an inadvertently fired paintball and the vents **1326** is designed to vent any pressure build up and allow the paint in any ruptured paintball to flow out of the apparatus **1320**. The barrel blocking apparatus **1320** also includes an open end **1328** and an engaging section **1330** having a plurality of spring loaded engaging members **1332**. The spring loaded engaging members **1332** are designed to engage the indentations **1310***a* or **1320***b* of the first row **1308***a* or second row **1308***b* of the barrel **1302**. The barrel blocking apparatus **1320** also includes a band **1334** having a plurality of lights **1336** as shown in FIGS. **13**A-C. The lights **1336** are powered by a battery **1338** wired to the lights **1336** by wires **1340**. Although the lights **1334** are shown disposed in a band region **1336** of the apparatus **1320**, the lights can also be arranged in a pattern or randomly distributed on the apparatus **1320**.

The present invention also relates to a barrel for a paintball gun including an external threaded section near its distal end. If the barrel is designed to be removed from the paintball gun, then the barrel also included a proximal threaded section so that the barrel can be screwed into the gun.

Referring now to FIGS. **14**A-E, an embodiment of a thread-type barrel locking assembly of this invention, generally **1400**, is shown to include a barrel **1402**. The assembly **1400** also includes a thread ring-type section **1404** (FIG. **14**B) that is designed to be pushed onto the barrel **1402** at its distal end **1406** (FIG. **14**C). The thread section **1404** is then either glued in place or is set in place by one or a plurality of Allen-type set screw (not shown). The threaded section **1404** is then designed to provide the barrel **1402** with a male threaded connector to engage a female connector associated with a barrel blocking apparatus as described below.

The assembly **1400** also includes a barrel blocking apparatus **1420**. The barrel blocking apparatus **1420** includes a closed end **1422**, a spike **1424** and a plurality of vents **1426**, where the spike **1424** is adapted to rupture an inadvertently fired paintball and the vents **1426** is designed to vent any pressure build up and allow the paint in any ruptured paintball to flow out of the apparatus **1420**. The barrel blocking apparatus **1420** also includes an open end **1428** and an internal threaded section **1430**, where the internal threaded section **1430** of the apparatus **1420** and the external threaded section **1406** are adapted to form a threaded connection **1432**, when the apparatus **1420** is threaded onto the distal end **1406** of the barrel **1402**. The barrel blocking apparatus **1420** also includes a band **1434** having a plurality of lights **1436**. The lights **1436** are powered by a battery **1438** wired to the lights **1436** by wires **1440**.

Referring now to FIGS. **15**A-D, an embodiment of a quick connect-type barrel locking assembly of this invention, generally **1500**, is shown to include a barrel **1502** having a flared section **1504** near its distal end **1506**. The flared section **1504** includes ring indentation or groove **1508** disposed on an inner surface **1510** of the barrel **1502**. The barrel **1502** can also includes a threaded section at its proximal end (not shown), where it would screw into an handle section of a paintball gun (not shown) or the paintball gun can just come equip with a barrel having an enlarged section near its distal end.

The assembly **1500** also includes a barrel blocking apparatus **1520**. The barrel blocking apparatus **1520** includes a closed end **1522**, a spike **1524** and a plurality of vents **1526**, where the spike **1524** is adapted to rupture an inadvertently fired paintball and the vents **1526** is designed to vent any pressure build up and allow the paint in any ruptured paintball to flow out of the apparatus **1520**. The barrel blocking apparatus **1520** also includes an open end **1528** and a plurality of protruding assemblies **1530**. The protruding assemblies **1530** include a bias means **1532** and a protrusion **1534** having beveled edges **1536** and a stop **1538**. Looking a FIG. **15**B, the protruding assemblies **1530** are shown extended, while looking at FIG. **15**C, the protruding assemblies **1530** are shown compressed. The apparatus **1520** is then designed to be inserted into the distal end **1506** until the protrusions **1534** spring into the groove **1508** as shown in FIG. **15**D. The barrel blocking apparatus **1520** also includes a band **1540** having a plurality of lights **1542**. The lights **1542** are powered by a battery **1544** wired to the lights **1542** by wires **1546**.

The present invention also relates to a barrel for a paintball gun including a flared section near its distal end having a ring indentation or groove. If the barrel is designed to be removed from the paintball gun, then the barrel also included a proximal threaded section so that the barrel can be screwed into the gun.

Referring now to FIGS. **16**A-C, an embodiment of a threaded barrel locking assembly of this invention, generally **1600**, is shown to include a barrel **1602** having a flared section **1604** near its distal end **1606**. The flared section **1604** includes a threaded section **1608** disposed on an inner surface **1610** of the barrel **1602**. The barrel **1602** can also includes a threaded section at its proximal end (not shown), where it would screw into an handle section of a paintball gun (not shown) or the paintball gun can just come equip with a barrel having an enlarged section near its distal end.

Looking at FIG. **16**B, The assembly **1600** also includes a barrel blocking apparatus **1620**. The barrel blocking apparatus **1620** includes a closed end **1622**, a spike **1624** and a plurality of vents **1626**, where the spike **1624** is adapted to rupture an inadvertently fired paintball and the vents **1626** is designed to vent any pressure build up and allow the paint in any ruptured paintball to flow out of the apparatus **1620**. The barrel blocking apparatus **1620** also includes an open end **1628** and an externally threaded section **1630**. The apparatus **1620** is then designed to be inserted into the distal end **1606** and screwed into place to form a threaded connection **1632** as shown in FIG. **16**C. The barrel blocking apparatus **1620** also includes a band **1634** having a plurality of lights **1636**. The lights **1636** are powered by a battery **1638** wired to the lights **1636** by wires **1640**.

The present invention also relates to a barrel for a paintball gun including a flared section near its distal end having a internally threaded section. If the barrel is designed to be removed from the paintball gun, then the barrel also included a proximal threaded section so that the barrel can be screwed into the gun.

Referring now to FIGS. **17**A-D, an embodiment of a multi-purpose barrel blocking and mounting assembly of this invention, generally **1700**, is shown to include a barrel **1702** having an external thread section **1704** near its distal end **1706**. The barrel **1702** can also include a threaded section at its proximal end, where it would screw into an handle section of a paintball gun (not shown) or the paintball gun can just come equip with an external threaded section near its distal end.

Looking at FIG. **17**B, the assembly **1700** also includes a multi-purpose barrel apparatus **1720**. The multi-purpose apparatus **1720** includes a barrel blocking apparatus **1730** and a barrel magnetic mounting apparatus **1760**. The barrel blocking apparatus **1730** includes a closed end **1732**, a spike **1734** and a plurality of vents **1736**, where the spike **1734** is adapted to rupture an inadvertently fired paintball and the vents **1736** is designed to vent any pressure build up and allow the paint in any ruptured paintball to flow out of the barrel blocking apparatus **1730**. The barrel blocking apparatus **1730** also includes an open end **1738** and an internal threaded section **1740**. The internal threaded section **1740** of the barrel blocking apparatus **1730** and the external threaded section **1706** are adapted to form a threaded connection **1742**, when the barrel blocking apparatus **1730** is threaded onto the distal end **1706** of the barrel **1702**. The barrel blocking apparatus **1730** also includes a band **1744** having a plurality of lights **1746**. The lights **1746** are powered by a battery **1748** wired to the lights **1746** by wires **1750**.

The barrel mounting apparatus **1760** includes a hollow body **1762** having a distal end **1764** and a proximal end **1766**. The apparatus **1760** also includes an internally threaded section **1768** located at or near the proximal end **1766** of the mounting apparatus **1760**. Like the barrel blocking apparatus **1730**, the internal threaded section **1768** of the mounting apparatus **1760** and the external threaded section **1706** are adapted to form a threaded connection **1770**, when the barrel blocking apparatus **1730** is threaded onto the distal end **1706** of the barrel **1702**. The mounting apparatus **1760** is mounted to the barrel blocking apparatus **1730** at permanent or detachable connector **1772**. The mounting apparatus **1760** includes a plurality of magnetic mounts **1774***a-c*, shown here as to row of three magnetic (four shown). Two mounts **1774***a* are position opposite the connector **1772**. Two mounts **1774***b* are located on right-side of the body **1762** (looking down the barrel), and two on the right side of the body **1762** (not shown). The magnetic mounts **1774** are designed to permit the mounting of sights, scopes, lights or other types paintball aids.

Looking at FIG. **17**C, the assembly **1700** is shown screwed onto the barrel **1702** via the barrel blocking apparatus **1730**, while the mounting apparatus **1760** is disposed on a bottom side **1712** of the barrel **1702**. Looking at FIG. **17**D, the assembly **1700** is shown screwed onto the barrel **1702** via the mounting apparatus **1760**, while the barrel blocking apparatus **1730** is disposed on a bottom side **1712** of the barrel **1702**. Looking at FIG. **17**E, the assembly **1700**, with the mounting apparatus **1760** screwed onto the distal end **1706** of the barrel **1702**, the assembly **1700** also includes a scope **1776** mounted on the top mounts **1774***a* via magnets **1778** disposed on the underside **1780** of the scope **1776**. The assembly **1700** also includes a light **1782** mounted on the left-side mounts **1774***c* via magnets **1784** disposed on the underside **1786** of the light **1782**. Although the scope and light are shown attached using magnetics, the mounts **1774** and the magnets **1778** and **1784** can be any type of mounting device including snaps, threaded connections, slide connectors with a tightener or any other type of mounting means to mount the scope or light on the mounting apparatus **1760**.

Referring now to FIGS. **18**A-D, an embodiment of a multi-purpose barrel blocking and mounting assembly of this invention, generally **1800**, is shown to include a barrel **1802** having an external thread section **1804** near its distal end **1806**. The barrel **1702** can also include a threaded section at its proximal end, where it would screw into an handle section of a paintball gun (not shown) or the paintball gun can just come equip with an external threaded section near its distal end.

Looking at FIG. **18**B, the assembly **1800** also includes a multi-purpose barrel apparatus **1720**. The multi-purpose apparatus **1820** includes a barrel blocking apparatus **1830** and a barrel magnetic mounting apparatus **1860**. The barrel blocking apparatus **1830** includes a closed end **1832**, a spike **1834** and a plurality of vents **1836**, where the spike **1834** is adapted to rupture an inadvertently fired paintball and the vents **1836** is designed to vent any pressure build up and allow the paint in any ruptured paintball to flow out of the barrel blocking apparatus **1830**. The barrel blocking apparatus **1830** also includes an open end **1838** and an internal threaded section **1840**. The internal threaded section **1840** of the barrel blocking apparatus **1830** and the external threaded section **1806** are adapted to form a threaded connection **1842**, when the barrel blocking apparatus **1830** is threaded onto the distal end **1806** of the barrel **1802**. The barrel blocking apparatus **1830** also includes a band **1844** having a plurality of lights **1846**. The lights **1846** are powered by a battery **1848** wired to the lights **1846** by wires **1850**.

The barrel magnetic mounting apparatus **1860** includes a hollow body **1862** having a distal end **1864** and a proximal end **1866**. The apparatus **1860** also includes clamping apparatus **1868** located at or near the proximal end **1866** of the mounting apparatus **1860**. The clamping apparatus **1868** includes engaging member **1870**. When the barrel blocking apparatus **1830** is inserted onto the distal end **1806** of the barrel **1802**, the clamping apparatus **1868** is tightened causing the engaging members **1870** to engage the threaded section **1804** at the distal end **1806** of the barrel **1802** to form a locking connection **1871**. The mounting apparatus **1860** is mounted to the barrel blocking apparatus **1830** at permanent or detachable connector **1872**. The mounting apparatus **1860** includes a plurality of magnetic mounts **1874***a-c*, shown here as to row of three magnetic (four shown). Two mounts **1874***a* are position opposite the connector **1872**. Two mounts **1874***b* are located on right-side of the body **1862** (looking down the barrel), and two on the right side of the body **1862** (not shown). The magnetic mounts **1874** are designed to permit the mounting of sights, scopes, lights or other types paintball aids.

Looking at FIG. **18**C, the assembly **1800** is shown screwed onto the barrel **1802** via the barrel blocking apparatus **1830**, while the mounting apparatus **1860** is disposed on a bottom side **1812** of the barrel **1802**. Looking at FIG. **18**D, the assembly **1800** is shown screwed onto the barrel **1802** via the mounting apparatus **1860**, while the barrel blocking apparatus **1830** is disposed on a bottom side **1812** of the barrel **1802**. Looking at FIG. **18**E, the assembly **1800**, with the mounting apparatus **1860** screwed onto the distal end **1806** of the barrel **1802**, the assembly **1800** also includes a scope **1876** mounted on the top mounts **1874***a* via magnets **1878** disposed on the underside **1880** of the scope **1876**. The assembly **1800** also includes a light **1882** mounted on the left-side mounts **1874***c* via magnets **1884** disposed on the underside **1886** of the light **1882**.

Although the barrel blocking apparatuses and the multi-purpose apparatuses of this invention have been shown with a number of different type of detachable locking connections to appropriately designed barrels, any other connecting design can be used to lockingly mount a barrel blocking apparatus to the end of a specifically designed barrel so that the blocking devices can withstand multiple inadvertent paintball firings without endangering innocent bystanders, referees, or other payer before or after a game or training episode. We have shown threaded connections and some quick connectors, but any other type of quick connection connectors can be used

such as those disclosed in U.S. Pat. Nos. 4,660,804, 6,786,516, 6,733,047, 7,044,505, 7,044,506, incorporated therein by reference.

Referring now to FIGS. **19**A-J, several embodiments of mounting assemblies of this invention, generally **1900**, are shown. Looking at FIGS. **19**A&B, a screw-type mount **1900** is shown to including a single mounting member **1902** and a curved elongate mount **1904** having a thumb screw assembly **1906** for engaging a threaded post **1908** of a scope, light or other paintball accessory **1910** that can be mounted on a barrel mount assembly of this invention. The thumb screw assembly **1906** including a housing **1912** including a nut **1914** having a threaded aperture **1916** therethrough and an aperture **1918** in the mount **1904** leading from the nut **1914** to an inner surface **1920** of the mount **1904** adapted to receive the threaded post **1908**.

Looking at FIGS. **19**C&D, a screw-type mount **1900** is shown to including two mounting members **1902** and a curved elongate mount **1904** having a thumb screw assembly **1906** for engaging a threaded post **1908** of a scope, light or other paintball accessory **1910** that can be mounted on a barrel mount assembly of this invention. The thumb screw assembly **1906** including a housing **1912** including a nut **1914** having a threaded aperture **1916** therethrough and an aperture **1918** in the mount **1904** leading from the nut **1914** to an inner surface **1920** of the mount **1904** adapted to receive the threaded post **1908**.

Looking at FIGS. **19**E&F, a tube-type mount **1900** is shown to including a tubular member **1902** affixed to a table **1904** which is affixed to a mount **1906**. The tubular member **1902** is designed to receive a scope or other tubular paintball accessory **1908**.

Looking at FIGS. **19**G&H, a tube-type mount **1900** is shown to including a tubular member **1902** affixed to a rotatable member **1903** mounted on a table **1904** which is affixed to a mount **1906**. The tubular member **1902** is designed to receive a scope or other tubular paintball accessory **1908**.

Looking at FIGS. **19**I&J, a tube-type mount **1900** is shown to including two tubular members **1902** affixed to a table **1904** which is mounted on a rotatable member **1905** affixed to a mount **1906**. The tubular member **1902** is designed to receive a scope or other tubular paintball accessory **1908**.

New Embodiments

Referring now to FIG. **20**A, another embodiment of barrel blocking apparatus of this invention, generally **2000**, is shown to include a barrel engaging member **2002** adapted to engage a distal end **2004** of a barrel **2006** of a non-lethal gun (remainder of the gun is not shown) such as a paintball gun or a foam ball gun. The engaging member **2002** includes engaging connector **2008** having a threaded outer sleeve **2010** adapted to force for engaging pads **2012** disposed at or near a distal end **2013**. Each pad **2012** includes a trapezoidal sleeve engaging portion **2014** and a barrel engaging portion **2016**. The barrel engaging member **2002** also includes a threaded male connector **2018** disposed at or near a distal end **2020** of the engaging member **2002**. The apparatus **2000** also includes a blocking member **2022** including closed end **2024** and an open end **2026**. The open end **2026** includes a female threaded connector **2028** adapted to engage the male threaded connector **2018** of the engaging member **2002**. Disposed on an inner surface **2030** of the closed end **2024** of the blocking member **2022** is an insert **2032** surrounding a penetrator **2034**. The blocking member **2022** also includes a plurality of vents **2036** and optionally a light **2038** adapted to evidence that the barrel blocking member **2022** is attached to the barrel **2006**. Looking at FIG. **20**B, a view from along the section lines A is shown illustrating now the pads **2012** engage the barrel **2006** once the sleeve **2010** has been tightened along a threaded distal end **2013** of the engaging member **2002**.

Referring now to FIG. **21**A, another embodiment of barrel blocking apparatus of this invention, generally **2100**, is shown to include a barrel engaging member **2102** adapted to engage a distal end **2104** of a barrel **2106** of a non-lethal gun (remainder of the gun is not shown) such as a paintball gun or a foam ball gun. The engaging member **2102** includes engaging connector **2108** having a threaded outer sleeve **2110** adapted to force for engaging pads **2112** disposed at or near a distal end **2113**. Each pad **2112** includes a trapezoidal sleeve engaging portion **2114** and a barrel engaging portion **2116**. The barrel engaging member **2102** also includes a threaded male connector **2118** disposed at or near a distal end **2120** of the engaging member **2102**. The apparatus **2100** also includes a blocking member **2122** including closed end **2124** and an open end **2126**. The open end **2126** includes a female threaded connector **2128** adapted to engage the male threaded connector **2118** of the engaging member **2102**, and the closed end **2124** includes a second female connector **2129**. Disposed on an inner surface **2130** of the closed end **2124** of the blocking member **2122** is an insert **2132** surrounding a penetrator **2134**. The blocking member **2122** also includes a plurality of vents **2136**. The apparatus **2100** also includes an end member **2138** having a male threaded connector **2140** adapted to engage the second female connector **2129** of the blocking member **2122**. The end member **2138** can include lighting means **2142** adapted to evidence that the barrel blocking member **2122** is attached to the barrel **2106** so that participants in a game or an exercise will be able to readily identify inactive participants. The end member **2138** can also include other devices such as sound generators, GPS positioning devices or the like. Looking at FIG. **21**B, a view from along the section lines A is shown illustrating now the pads **2112** engage the barrel **2106** once the sleeve **2110** has been tightened along a threaded distal end **2113** of the engaging member **2102**.

Referring now to FIG. **22**A, another embodiment of barrel blocking apparatus of this invention, generally **2200**, is shown to include a barrel engaging member **2202** adapted to engage a distal end **2204** of a barrel **2206** of a non-lethal gun (remainder of the gun is not shown) such as a paintball gun or a foam ball gun. The engaging member **2202** includes engaging connector **2208** having a threaded outer sleeve **2210** adapted to force for engaging pads **2212** disposed at or near a distal end **2213**. Each pad **2212** includes a trapezoidal sleeve engaging portion **2214** and a barrel engaging portion **2216**. The barrel engaging member **2202** also includes a female quick connector **2218** disposed at or near a proximal end **2220** of the engaging member **2202**. The apparatus **2200** also includes a blocking member **2222** including closed end **2224** and an open end **2226**. The open end **2226** includes a male quick connector **2228** adapted to engage the female quick connector **2218** of the engaging member **2202**, and the closed end **2224** includes a second female quick connector **2229**. Disposed on an inner surface **2230** of the closed end **2224** of the blocking member **2222** is an insert **2232** surrounding a penetrator **2234**. The blocking member **2222** also includes a plurality of vents **2236**. The apparatus **2200** also includes an end member **2238** having a male quick connector **2240** adapted to engage the second female connector **2229** of the blocking member **2222**. The end member **2238** can include lighting means **2242** adapted to evidence that the barrel blocking member **2222** is attached to the barrel **2206** so that participants in a game or an exercise will be able to readily identify inactive participants. The end member **2238** can also

include other devices such as a front light, a sound generator, a GPS positioning device or the like **2244**. Looking at FIG. **22**B, a view from along the section lines A is shown illustrating now the pads **2212** engage the barrel **2206** once the sleeve **2210** has been tightened along a threaded distal end **2213** of the engaging member **2202**. Looking at FIG. **22**C, a view from along the section lines B is shown illustrating now the male quick connector **2228** of the blocking member **2222** engages the female quick connector **2218** of the engaging member **2202**. The connector **2228** includes four indentations **2246** adapted to fit into four protrusions **2248** in the connector **2228**, while four protrusions **2250** of the connector **2228** fit into four indentations **2252** in the connector **2218**. The connector **2228** is pushed into the connector **2218** until the protrusions **2250** of the connector **228** are in a circular groove **2254** in the connector **2218**, where the protrusions **2250** are below the lower extent of the protrusions **2252**. The connection is then made by simply rotating the blocking member **2222** to the right or left so that the protrusions **2250** of the connector **2228** are coincident with but below the protrusions **2252** of the connector **2218**. Although one form of a quick connect is shown, the connection can also be any other quick connect such as the quick connects used in water, gas and air lines such as those disclosed in U.S. Pat. Nos. 4,660,804, 6,786,516, 6,733,047, 7,044,505, 7,044,506, incorporated therein by reference.

Referring now to FIG. **23**A, another embodiment of barrel blocking apparatus of this invention, generally **2300**, is shown to include a barrel blocking engaging member **2302** located near a distal end **2304** of a barrel **2306** of a non-lethal gun (remainder of the gun is not shown) such as a paintball gun or a foam ball gun, where the member **2302** can be affixed to or integral with of the barrel **2306**. The barrel engaging member **2302** also includes a female quick connector **2318** disposed at or near a proximal end **2320** of the engaging member **2302**. The apparatus **2300** also includes a blocking member **2322** including closed end **2324** and an open end **2326**. The open end **2326** includes a male quick connector **2328** adapted to engage the female quick connector **2318** of the engaging member **2302**, and the closed end **2324** includes a second female quick connector **2329**. Disposed on an inner surface **2330** of the closed end **2324** of the blocking member **2322** is an insert **2332** surrounding a penetrator **2334**. The blocking member **2322** also includes a plurality of vents **2336**. The apparatus **2300** also includes an end member **2338** having a male quick connector **2340** adapted to engage the second female connector **2329** of the blocking member **2322**. The end member **2338** can include lighting means **2342** adapted to evidence that the barrel blocking member **2322** is attached to the barrel **2306** so that participants in a game or an exercise will be able to readily identify inactive participants. The end member **2338** can also include other devices such as a front light, a sound generator, a GPS positioning device or the like **2344**. Looking at FIG. **23**B, a view from along the section lines B is shown illustrating now the male quick connector **2328** of the blocking member **2322** engages the female quick connector **2318** of the engaging member **2302**. The connector **2328** includes four indentations **2346** adapted to fit into four protrusions **2348** in the connector **2328**, while four protrusions **2350** of the connector **2328** fit into four indentations **2352** in the connector **2318**. The connector **2328** is pushed into the connector **2318** until the protrusions **2350** of the connector **238** are in a circular groove **2354** in the connector **2318**, where the protrusions **2350** are below the lower extent of the protrusions **2352**. The connection is then made by simply rotating the blocking member **2322** to the right or left so that the protrusions **2350** of the connector **2328** are coincident with but below the protrusions **2352** of the connector **2318**. Although one form of a quick connect is shown, the connection can also be any other quick connect such as the quick connects used in water, gas and air lines such as those disclosed in U.S. Pat. Nos. 4,660,804, 6,786,516, 6,733,047, 7,044,505, 7,044,506, incorporated therein by reference.

Referring now to FIGS. **24**A-C, another embodiment of barrel blocking apparatus of this invention, generally **2400**, is shown to include a barrel **2402** having an enlarged end section **2404**. The enlarged end section **2404** include a plurality of opposing apertures **2406** aligned in a row **2408**. The aperture **2406** are designed to receive a pin as described below. The apparatus **2400** also includes a barrel plug **2410**. The barrel plug **2410** includes a curved end **2412**, a cylindrical protrusion **2414** having a vertical aperture **2416** and ending in a penetrator **2418**, a fasting protrusion **2420** having a vertical aperture **2422** and a horizontal aperture **2424** and a pin **2426**. The horizontal aperture **2424** is adapted to house the pin **2426** when the plug **2410** is not inserted into the barrel **2402**. The apertures **2406** in the section **2404** and the two vertical apertures **2416** and **2422** are designed to receive the pin **2426** when the plug **2410** is inserted in to the barrel **2402**. The pin **2426** can have include spring loaded stops **2428** that prevent the pin **2426** from falling out once it has been inserted though the apertures **2406** in the section **2404** and the vertical apertures **2416** and **2422**.

Detailed Description of Figures for This CIP

Referring now to FIGS. **25**A-E, another embodiment of barrel blocking apparatus of this invention, generally **2500**, is shown. Looking at FIG. **25**A, the apparatus **2500** includes a barrel plug or insertion portion **2502** and an outer portion **2504**. The insertion portion **2502** includes a center post **2506** attached to or mounted on a top section **2508** of the outer portion **2504**. The outer portion **2504** also includes a surrounding section **2510**. The top section **2508** is mounted in a groove **2512** in the surrounding section **2510** of the outer portion **2504**, while the central post **2506** extends through an aperture **2514** in the surrounding section **2510**.

The surrounding section **2510** also includes an outer downwardly extending lip **2516** and a circular groove **2518** disposed on a lower surface **2520** of the surrounding section **2510** adjacent the lip **2516** and adapted to receive the end **2522** of the barrel **2524** of a paintball gun or other non-lethal gun. Extending from the lower surface **2520** of the surrounding section **2510** adjacent the groove **2518** are a plurality (four here) of prongs **2526** that form part of the insertion portion **2502**. The prongs **2526** include grooves **2528** adapted to receive a friction ring (O-ring here) **2530**. The prongs **2526** are spaced apart to form gaps **2532** therebetween as shown in FIGS. **25**B, **25**D and **25**E.

The central post **2506** includes a flared portion **2534** near its distal end **2536**. The prongs **2526** have inner surfaces **2538** conformed to the flared portion **2534** of the post **2506**. In the flared portion **2534** of the post **2506** are raised sections **2540** as shown in FIGS. **25**B, **25**D and **25**E, which are designed to be disposed in the gaps **2532** between the prongs **2526** when the apparatus **2500** is its unlocked state. The top section **2508** includes a winged shaped member **2542** adapted to be turned by a user so that the top section **2508** can be rotated relative to the surrounding section **2510**. When the top section **2508** is rotated via the member **2542**, the post **2506** also rotates. After about a quarter turn, the post **2506** rotates sufficient to engage the conforming surfaces **2538** of the prongs **2526** are pushed outward compressing the fiction ring **2530** forcing it against an inner surface **2544** of the barrel **2524** to frictionally lock

the apparatus **2500** in place. This locking process is shown in the transitional FIGS. **25**D and **25**E (cut along the section line DE), which show the apparatus **2500** its unlocked state and in its locked state, respectively, showing the compression of the friction ring **2530**.

The central post **2506** can also include a penetrator **2546** disposed in the distal end **2536** of the post **2506** and adapted to assist in rupturing paintball that are inadvertently fired from the gun. The post **2506** can also include vents **2548** in its distal end **2536** opening at locations **2550** in the flared section **2534** of the post **2506**. The vents **2548** are blocked when the apparatus **2500** is in its unlocked state, but open into connecting conduits **2552** that extend up along the post **2506** and out of the surround section **2510** at locations **2554**.

Referring now to FIGS. **25**F&G, the barrel blocking apparatus **2500** is shown to include a secondary spring loaded locking assembly **2556** disposed on a side of the surrounding section **2510**. The assembly **2556** includes a housing **2558**, a shaft **2560** having a spring stop **2562** and a cap **2564**. The housing **2558** also includes a spring **2566**. The shaft **2560** is adapted to insert into an aperture **2568** in the barrel **2524** and extend into a receiving opening **2570** in the surrounding section **2510**. The cap **2564** is adapted to allow the shaft **2560** be withdrawn from the barrel aperture **2568** to remove the apparatus **2500** before or after it has been unlocked. When placing the apparatus **2500** with the spring loaded assembly on a barrel, the cap **2564** is pulled to allow the apparatus to go over the barrel, then the spring will force the shaft into an appropriate barrel aperture. The secondary locking assembly acts as a secondary safeguard to ensure that inadvertently fired paintballs cannot exit the end of the barrel. FIG. **25**A shows the assembly **2556** in its locked position, while FIG. **25**B shows the assembly **2556** in its unlocked position.

Referring now to FIGS. **26**A-D, another embodiment of barrel blocking apparatus of this invention, generally **2600**, is shown. Looking at FIGS. **26**A&B, the apparatus **2600** includes a barrel plug or insertion portion **2602** and an outer portion **2604**. The insertion portion **2602** includes a center post **2606** attached to or mounted on a top section **2608** of the outer portion **2604**. The outer portion **2604** also includes a surrounding section **2610**. The top section **2608** is mounted in a groove **2612** in the surrounding section **2610** of the outer portion **2604**, while the central post **2606** extends through an aperture **2614** in the surrounding section **2610**.

The surrounding section **2610** also includes an outer downwardly extending lip **2616** and a circular groove **2618** disposed on a lower surface **2620** of the surrounding section **2610** adjacent the lip **2616** and adapted to receive the end **2622** of the barrel **2624** of a paintball gun or other non-lethal gun. Extending from the lower surface **2620** of the surrounding section **2610** adjacent the groove **2618** are a plurality (four here) of prongs **2626** that form part of the insertion portion **2602**. The prongs **2626** include grooves **2628** adapted to receive a friction ring (O-ring here) **2630**. The prongs **2626** are spaced apart to form gaps **2632** therebetween as shown in FIGS. **26**C and **26**D.

The central post **2606** includes a flared portion **2634** near its distal end **2636**. The prongs **2626** have inner surfaces **2638** conformed to the flared portion **2634** of the post **2606**. In the flared portion **2634** of the post **2606** are raised sections **2640** as shown in FIGS. **26**C and **26**D, which are designed to be disposed in the gaps **2632** between the prongs **2626** when the apparatus **2600** is its unlocked state. The top section **2608** includes a winged shaped member **2642** adapted to be turned by a user so that the top section **2608** can be rotated relative to the surrounding section **2610**. When the top section **2608** is rotated via the member **2642**, the post **2606** also rotates. After about a quarter turn, the post **2606** rotates sufficient to engage the conforming surfaces **2638** of the prongs **2626** are pushed outward compressing the fiction ring **2630** forcing it against an inner surface **2644** of the barrel **2624** to frictionally lock the apparatus **2600** in place. This locking process is shown in the transitional FIGS. **26**C and **26**D (cut along the section line CD), which show the apparatus **2600** its unlocked state and in its locked state, respectively, showing the compression of the friction ring **2630**.

The central post **2606** can also include a penetrator **2646** disposed in the distal end **2636** of the post **2606** and adapted to assist in rupturing paintball that are inadvertently fired from the gun. The post **2606** can also include vents **2648** in its distal end **2636** opening at locations **2650** in the flared section **2634** of the post **2606**. The vents **2648** are blocked when the apparatus **2600** is in its unlocked state, but open into connecting conduits **2652** that extend up along the post **2606** and out of the surround section **2610** at locations **2654**.

The barrel blocking apparatus **2600** can also include a secondary spring loaded locking assembly **2656** disposed on a side of the surrounding section **2610**. The assembly **2656** includes a housing **2658**, a shaft **2660** having a spring stop **2662** and a cap **2664**. The housing **2658** also includes a spring **2666**. The shaft **2660** is adapted to insert into an aperture **2668** in the barrel **2624** and extend into a receiving opening **2670** in the surrounding section **2610**. The cap **2664** is adapted to allow the shaft **2660** be withdrawn from the barrel aperture **2668** to remove the apparatus **2600** before or after it has been unlocked. When placing the apparatus **2600** with the spring loaded assembly on a barrel, the cap **2664** is pulled to allow the apparatus to go over the barrel, then the spring will force the shaft into an appropriate barrel aperture. The secondary locking assembly acts as a secondary safeguard to ensure that inadvertently fired paintballs cannot exit the end of the barrel. FIG. **26**A shows the assembly **2656** in its locked position, while FIG. **26**B shows the assembly **2656** in its unlocked position.

Referring now to FIGS. **27**A-*d*, another embodiment of barrel blocking apparatus of this invention, generally **2700**, is shown. Looking at FIG. **27**A, the apparatus **2700** includes a body **2702** and a rotatable ring **2704** having a gripping surface **2706**. The apparatus **2700** is adapted to engages a grooved barrel end **2708** of a paintball barrel **2710**. The grooved end **2708** includes two radial grooves **2712***a&b*. The grooved end **2708** also includes a tapered distal end **2714**. Although two barrel grooves are shown and the barrel is tapered, the barrel end can be untapered and include only one groove or more than two grooves depending on design and style.

The body **2702** includes sis downwardly extending, spaced apart prongs **2716** having a first raised area **2718***a* adapted to engage the first barrel groove **2712***a*, and a second raised area **2718***b* adapted to engage the second barrel groove **2712***b*. The ring **2704** includes protrusions **2720** that are disposed to fit inside gaps **2722** between the prongs **2716** when the apparatus is in its unlocked state. Once rotated, the protrusions **2720** in the ring **2704** contact an outer surface **2724** of each prong **2716** forcing the raised areas **2718***a&b* into their aligned barrel grooves **2712***a&b*, respectively.

The body **2702** can also include a penetrator **2726** disposed on an inner surface **2736** of the body **2702** and adapted to assist in rupturing paintball that are inadvertently fired from the gun. The body **2702** can also include vents **2728** in therein adapt to vent paint and gases accompanying an inadvertently discharged and ruptured paintball.

All references cited herein are incorporated by reference. Although the invention has been disclosed with reference to its preferred embodiments, from reading this description

those of skill in the art may appreciate changes and modification that may be made which do not depart from the scope and spirit of the invention as described above and claimed hereafter.

We claim:

1. A barrel blocking apparatus comprising:

an insertion portion including:

a top section,

a central post attached to or mounted from an inner surface of the top section, where the central post includes:

a flared end, and

raised areas,

a surrounding section including:

a mounting groove in which the top section is mounted,

a central aperture through which a narrow portion of the post passed through,

a lip and an adjacent groove for engaging the end of the barrel of a paintball gun,

a friction ring,

a plurality of spaced apart prongs adjacent the groove and extending downward from

a lower surface of the surrounding section, each prong including a groove adapted to

receive the friction ring,

where the top section and post are adapted to be rotated relative to the surrounding section an amount sufficient to force the raised areas of the post to engage conforming outer surfaces of the prongs and compress the frictional ring against the inner surface of the barrel with sufficient force to hold the apparatus in place and where the post is designed to apply greater force against the prongs and friction ring when struck by an inadvertently discharged paintball.

2. The apparatus of claim **1**, wherein the post further includes vents and the surrounding section further includes conduits in gas communication with the vents when the apparatus is in a locked state.

3. The apparatus of claim **1**, wherein the post further includes a spike.

4. The apparatus of claim **1**, wherein the post further includes a spike and vents and the surrounding section further includes conduits in gas communication with the vents when the apparatus is in a locked state.

5. The apparatus of claim **1**, further comprising a spring loaded secondary locking assembly designed to insert a retractable shaft into an aperture in the barrel when locked and to be unlocked by disengaging the shaft by pulling on a cap attached to the distal end of the assembly and where the assembly is attached to or integral with the surrounding section at a side thereof.

* * * * *